12-1-2013

Assessing Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Anesthesia Practice

Laurie E. Parkman
Georgia College and State University

GEORGIA COLLEGE
GEORGIA'S PUBLIC LIBERAL ARTS UNIVERSITY

Doctor of Nursing Practice Capstone Project Agreement

Student Name: Laurie E. Parkman

Student Signature: Laurie E. Parkman

Committee Chair Name: Dr. Leslie Moore

Committee Chair Signature: Leslie Moore

Committee Member Name: Dr. Deborah MacMillan

Committee Member Signature: Deborah MacMillan

Committee Member Name: Dr. Brett Morgan

Committee Member Signature:

Agreement Date: 01 /10/2013

Assessing Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Anesthesia Practice

Laurie E. Parkman

Georgia College & State University

Leslie Moore, PhD, RN, CNE, MBA, Committee Chair

Deborah MacMillan, PhD, RNC, CNM, Committee Member

Brett Morgan, CRNA, DNP, Committee Member

Table of Contents

Abstract

Evidence-based practice is the integration and synthesis of the best research evidence with clinical expertise and patient values. Use of evidence-based practice decreases variability in care and improves patient outcomes. This research project assessed variables that inhibit the adoption of evidence-based practice into individual CRNAs' practice. Ninety-two CRNAs in Georgia participated in an email survey to assess attitudes and perceived barriers to evidence-based practice. Attitudes toward evidence-based practice were assessed with the Evidence-Based Practice Questionnaire (EBPQ), and perceived barriers to the use of evidence-based practice were assessed with the BARRIERS scale. A Pearson product-moment correlation coefficient was computed to assess the relationship between collected CRNA demographics and each of the instruments. There was a significant and positive correlation between characteristics of the CRNA and CRNA experience (r = .27, n = 69, p = .02), indicating that more experienced CRNAs perceived greater barriers to utilization of EBP. There was also a significant and negative correlation between characteristics of the CRNA and level of education (r =-.34, n=69, p=.005), indicating that as CRNA education increases, perceived barriers to utilization of EBP decrease. No statistical significance was found in relationships between any other CRNA characteristics and perceived barriers.

Keywords: certified registered nurse anesthetist, evidence-based practice, attitudes, barriers

CHAPTER I

Introduction

In Georgia, Certified Registered Nurse Anesthetists (CRNAs) are Advanced Practice Registered Nurses licensed by the State of Georgia. CRNAs have practiced anesthesia for nearly 150 years, and administer 32 million anesthetics to patients annually (American Association of Nurse Anesthetists, 2011a). CRNAs are the sole provider of anesthesia in some rural settings, which allows the provision of obstetrical and surgical services to local populations (American Association of Nurse Anesthetists, 2011a).

Evidence-based practice (EBP) is the integration of a provider's clinical expertise and the best available proven interventions to provide care while taking the patient's setting into consideration (Straus, 2011, Richardson, & Haynes, 2011). Kohl and Hanson (Miller, 2010, Fleisher, Wierner-Kronish, & Young, 2010) discussed the rationale for developing evidence-based anesthesia protocols in the context of improving the quality of patient care and patient outcomes. Implementation of evidence-based care has been shown to improve patient outcomes by 28% (Westfall, Mold, & Fagnan, 2007). Unfortunately the literature supports that up to two decades may pass before the findings of original research become part of routine clinical practice (Agency for Healthcare Research and Quality, 2001; Balas & Boren, 2000; Committee on Quality of Health Care in America, 2001).

Problem Statement

As patients live longer with more complex disease processes (Committee on Quality of Health Care in America, 2001; Hines, 2009), CRNAs must practice using the best available information to ensure the continued delivery of high quality care. Awareness and incorporation of evidence-based interventions into practice maintains this high quality (Heater, Becker, &

Olson, 1988). Implementation of evidence-based practice is the responsibility of every provider. A review of studies in the United States shows at least 30%-40% of patients do not receive evidence-based care, and 20% of all care provided is either unnecessary or even harmful to patients (Grol & Grimshaw, 2003). The Institute of Medicine (IOM) issued a report in 2003 calling for health professional education programs to include evidence-based care among five core competencies (Committee on the Health Professions Education Summitt Institute of Medicine, 2003). The IOM has set a goal that 90% of all patient-care decisions should be based on evidence by 2020 (Committee on the Health Professions Education Summitt Institute of Medicine, 2003).

The cost of not using evidence-based practice in terms of lives lost may be reflected in recorded anesthesia-related deaths. There were 2,211 recorded anesthesia-related deaths in the United States during 1999–2005, attributable to overdose and adverse effects of anesthetics, complications of anesthesia during pregnancy, labor, and puerperium, and other complications of anesthesia (Li, Warner, Lang, Huang, & Sun, 2009). Perhaps many of these deaths are avoidable through the increased implementation of evidence-based practice among CRNAs.

Purpose of the Project

The purpose of this project was to examine attitudes regarding perceived barriers and facilitators of the use of evidence-based practice in CRNAs in Georgia. Specifically, this research project assessed variables that inhibit the adoption of evidence-based practice into individual CRNAs' practice. Identification of barriers to incorporating evidence-based practice into CRNAs' practice is necessary before interventions aimed at reducing those barriers can be developed and tested. This project was a first step to improve patient outcomes through increased use of evidence-based practice among CRNAs.

Specific Aims and Clinical Questions

This descriptive, correlational study addressed the following specific aim and clinical questions.

Specific Aim I

Specific Aim I of this study was to assess the attitudes toward the use of EBP in CRNAs in Georgia.

Specific Aim II

Specific Aim II of this study was to identify potential barriers that will discourage the use of EBP in CRNAs in Georgia.

Specific Aim III

Specific Aim III of this study was to identify potential facilitators that will encourage the use of EBP in CRNAs in Georgia.

Specific Aim IV

Specific Aim IV of this study was to identify individual CRNAs' thoughts of EBP and explore the extent of the inclusion of the concept of EBP into their daily anesthetic delivery.

Clinical Question 1: What are CRNAs' common attitudes to implementation of EBP?

Clinical Question 2: What are CRNAs' common perceived barriers that discourage implementation of EBP?

Clinical Question 3: What are CRNAs' common perceived facilitators that encourage implementation of EBP?

Clinical Question 4: Is there a relationship between perceived barriers to the implementation of EBP and demographic variables CRNAs' age, gender, ethnicity, level of education, number of years as a CRNA?

Clinical Question 5: Is there a relationship between perceived barriers to implementation of EBP and CRNAs' practice environments, type of primary job facility, medical supervision, independent contractor, urban or rural location, and ease of access to Internet for research purposes?

Clinical Question 6: How large an effect does your use of formal, written practice guidelines such as those generated by physician organizations, insurance companies or HMOs, or government agencies have on CRNAs' practice of anesthesia?

Qualitative Interviews

The interviews with individual anesthetists focused on the following questions.

Qualitative Question 1: What does EBP means to you?

Qualitative Question 2: Do you think about EBP? What do you think about EBP?

Qualitative Question 3: How would increasing utilization/utilizing EBP change your anesthesia practice?

Qualitative Question 4: What types of activities do you engage in presently to ensure your practice is kept up to date?

Conceptual Theory

In 1947, Kurt Lewin, a German social psychologist, originally proposed a notion of planned change, which included field theory, group dynamics, action research, and a three-stage theory of change (McGarry, Cashin, & Fowler, 2012). According to Lewin, these conceptual theories are inter-related and necessary pieces to any change, whether at an individual, group, or organizational level (McGarry et al., 2012).

Field Theory

The field theory describes the status quo of the situation under study and the influences that formed it (McGarry et al., 2012). The operating room (OR) is a dynamic place with constantly moving people. Fast paced, it functions like a ballet, or a well-oiled machine. Patients are first scheduled for surgery, and all preoperative tasks are completed, such as insurance approval, scheduling, and consultation with the anesthesia provider. Patients arrive at the health care facility and are prepped for surgery in a preoperative holding area. Members of the operating room staff prepare the OR with the required instruments and supplies; any specific requirements of the case are addressed. The surgery begins, and simultaneously, the next patient is being prepped for the second surgical case of the day. The process continues until the operating room cases are complete. Everyone knows his role and performs it. Any break in the routine will slow the production. In such an environment, change must be carefully planned. Because everyone has a pre-defined role, it is imperative to disseminate any potential change in the process to all stakeholders.

For example, venous thrombi tend to form at the induction of anesthesia with the marked decrease in blood flow to the lower extremities (Gordon, 2012). Prevention of thromboembolism during surgery is aided with the application of sequential compression devices (SCD), which provide pulsatile movement to the lower extremities during a surgical procedure, assisting in the prevention of venous stasis and potential formation of deep vein thrombosis (Gordon, 2012). However, Gordon (2012) states verification with the circulating nurse regarding the application and activation on SCD is not routinely taught to anesthesia students. The simple task of verifying the presence and operation of the compression devices before induction of anesthesia constitutes evidence-based practice.

With this example, the operating room is the field, or environment, in which the change

will take place. According to Lewin, any changes in the field or its elements results in changes in the behavior of other elements, namely other individuals in the field (McGarry et al., 2012). Therefore, a change in the patient, such as increased venous stasis that occurs with the induction of general anesthesia, will result in a change in the other elements. The circulator will apply SCDs to the patient to assist in preventing venous stasis and development of thromboembolism, and the nurse anesthetist will ensure the SCDs are in place before beginning the anesthetic.

Group Dynamics

Lewin defines a group as being larger than the characteristics of the individual members. To effect change in a group, the intervention should be at the level of the group (Gordon, 2012). As a whole, CRNAs are seen as providers of high quality cost effective anesthesia services (American Association of Nurse Anesthetists, 2011a). Using Lewin's theory, CRNAs as a whole must be assessed before any changes in behavior can be expected. Therefore, this project assessed CRNAs in Georgia for their attitudes toward and barriers to the implementation of EBP.

Action Research

With action research, Lewin emphasized an individual's total situation predicting individual change (McGarry et al., 2012). The individual proceeds in a circle of planning, action, and fact-finding about the results of the action, recognizing the forces that are affecting the groups of which the individual is a part. Lewin emphasizes collaborative and participative processes at the group level are necessary for a change in individual behavior (McGarry et al., 2012).

Three Step Model of Change

Lewin's three-step model of change includes unfreezing, moving, and refreezing. Lewin defines change as a dynamic balance, moving in opposing directions within an organization. A

driving force pushes toward change; a restraining force pushes back against change.

Unfreezing is Lewin's necessary first step of unlearning or discarding old behaviors (Bishop, 2011). In the OR, because each step is critical to a safe operation, any process or behavior of a team member must be anticipated by the other members. Therefore, the nurse anesthetist would have to change her behavior and "unfreeze" or unlearn previous routines as they affect other members.

During the moving step, the change is initiated (Bishop, 2011). From the previous example, the addition of the question to the circulating nurse is an example of moving, or of change occurring. The importance of EBP to patient outcomes should encourage all anesthetists to initiate change to include EBP.

Refreezing is the return of balance as the change is accepted (Bishop, 2011). Without this phase, the provider may return to the previous old habits. This solidifies the new practice as standard operating procedure (Current Nursing, 2011).

The attitudes and barriers to use of EBP by anesthesia providers must be assessed before any attempt at implementation of change. In the absence of this knowledge, the success or failure of a change may well be left to chance (Grol & Wensing, 2004). With the knowledge of attitudes and barriers to use the EBP by CRNAs, educational interventions can be planned for future research activity.

Lewin's change theory involves all stakeholders, implementing a 'bottom-up' approach that increases acceptance and implementation of change (Murphy, 2006). Lewin's three-step change model, in *Figure 1*, has been used to guide change in nursing treatment protocols and initiating patient education (Murphy, 2006; Williams & von Fintel, 2012).

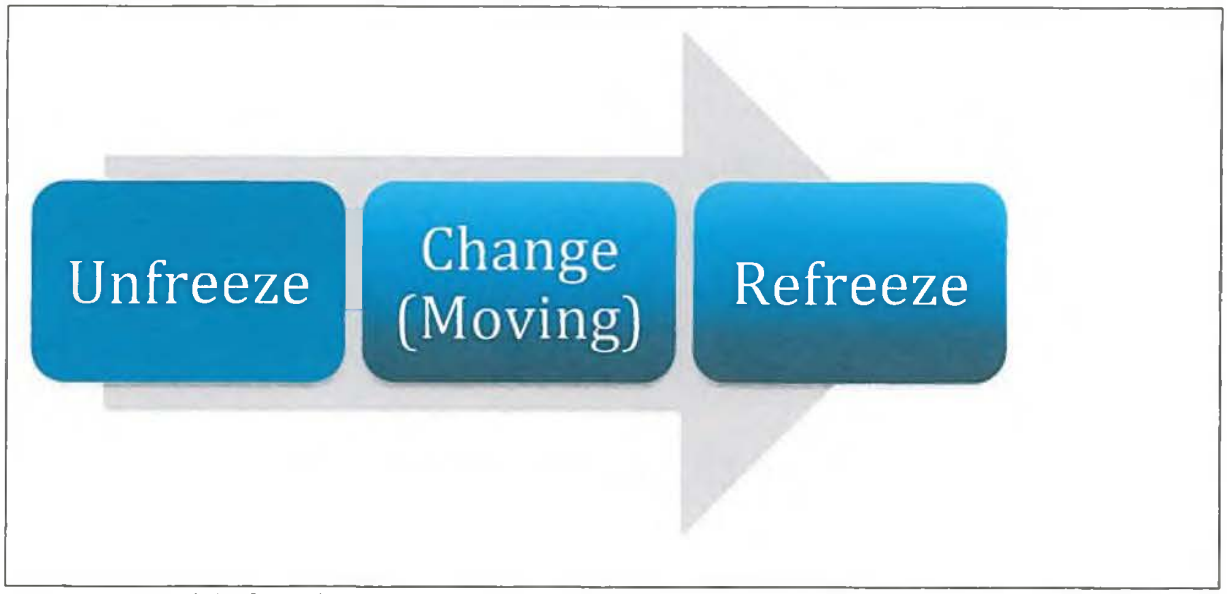

Figure 1. Model of Lewin's Change Theory. This figure illustrates the three phases of the Change Theory.

Using this theory as a framework, this study focuses on the "unfreezing" phase that must occur prior to effective change. According to Lewin, in order to initiate change, one has to understand the influences responsible for the status quo (McGarry et al., 2012). Translation of research into practice is best accomplished by identifying the barriers to implementation of evidence-based practice. This project provides a baseline assessment of CRNAs' attitudes toward the use of evidence-based practice. Assessing attitudes and perceived barriers of CRNAs toward the implementation of evidence-based practice is necessary to establish a baseline with which to compare any educational intervention.

Barriers to Implementation of Evidence-Based Practice

A barrier to change is defined as an obstacle or impediment. Many barriers to change among healthcare providers have been identified in the literature (Hutchinson & Johnston, 2004; Melnyk, 2007; Parahoo, 2000). Limited available time is a barrier to implementation of EBP common to all providers (Melnyk, 2007; Parahoo, 2000; Pellegrini, 2006; Rickbeil & Simones,

2012). A checklist is a common tool used in EBP, and barriers to checklists common to all providers have been identified. These barriers include feelings that the checklists are a waste of time, irrelevant, or insulting to a professional (Low, Walker, Heitmiller, & Kurth, 2012).

Additional barriers related to exposure to EBP and varying skill levels for incorporating evidence into practice have been identified (Stichler, Fields, Kim, & Brown, 2011; Upton & Upton, 2006). Lack of skills to implement EBP (Van Patter Gale & Schaffer, 2009), lack of knowledge about statistical analysis, and poor skills in the use of electronic databases are barriers to implementation (Stichler et al., 2011). Exposure to research courses may vary based on the degree requirements, thus creating another barrier to evidence-based practice.

Barriers may originate from the characteristics of the practice setting (Bogdan-Lovis & Sousa, 2006). The type and location of practice may be a barrier to use of EBP (Bogdan-Lovis & Sousa, 2006; Wennberg, 1984). Providers in a university setting were more likely to access EBP databases (Bogdan-Lovis & Sousa, 2006). As early as 1984, epidemiologists noticed different treatments regimes for similar disease processes in different parts of the United States (Wennberg, 1984). Cultures found in health care organizations may impede use of evidence-based practice (White & Dudley-Brown, 2012). An organization's values and beliefs mold locally acceptable behaviors in clinical care (Gross et al., 2001).

Disagreement among experts is a barrier to implementation of EBP (Gross et al., 2001). When there is uncertainty about the applicability of EBP, when alternative practices are available, or when there is ineffective dissemination of research findings, providers may not implement EBP (Gross et al., 2001).

Facilitators to Implementation of Evidence-Based Practice

Facilitators improve the use of EBP in a setting, and identifying facilitators will assist

organizations and individuals in attempts to increase EBP use. Many facilitators to the use of EBP have been identified. One is support of colleagues and administration (Funk, Champagne, Wiese, & Tornquist, 1991a). Nurses report ease of access to information and conducting more clinically focused, relevant research as facilitators. Increasing time available for reviewing and implementing findings, and improving the understandability of research reports also promotes EBP use (Funk, Champagne, Wiese, & Tornquist, 1991a).

Conclusion

Studies examining the attitudes toward and barriers to registered nurses' and physicians' use of evidence-based practice are available in the literature (Brown, Wickline, Ecoff, & Glaser, 2009; Ciaschi, Caprara, Gillespie, Furnari, & Mamede, 2011). However, this study specifically addressed CRNAs' attitudes and barriers. Identifying attitudes toward evidence-based practice helps guide attempts to implement evidence-based interventions and protocols for CRNAs' practice.

CHAPTER II

Review of Literature

Evidence-Based Practice

Definition

Evidence-based practice was introduced to medicine as a new practice paradigm in 1992 in response to a need to advance healthcare from the strict use of research findings in making clinical decisions to include the provider's experience and intuition (Pellegrini, 2006). Previously, medical care was based on tradition, intuition, and authority (Leach, 2006). EBP integrates clinically relevant research with clinical expertise and the patient's clinical state and setting (Straus et al., 2011). It has been defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Muir Gray, Haynes, & Richardson, 1996, p. 71) and addresses clinical questions posed in healthcare (Schardt & Mayer, 2010). With empirical evidence, strong clinical evidence and clinical expertise is then available to guide clinical practice (Timmermans & Mauck, 2005). For the purposes of this paper, EBP is considered synonymous with evidence-based medicine.

Patient outcomes improve with the implementation of evidence-based practice (Sackett et al., 1996). Clinical guidelines or protocols based on interventions with proven benefit decrease length of hospital stay (Bowman et al., 2005), have the potential to reduce morbidity and mortality, and improve quality of life (Woolf, Grol, Hutchinson, Eccles, & Grimshaw, 1999). The Institute of Medicine's (Committee on Quality of Health Care in America, 2000) *To Err is Human* report stated clinical practice guidelines might improve the quality of medical care and minimize errors, inappropriate care, and variations in care provided. However, a large gap exists between the best evidence available and actual practice (Davis et al., 2003). A study of guideline

adherence among 200 family physicians in the Netherlands found that approximately 35% of decisions made by physicians were not in agreement with national recommended standards (Grol, 2001). Indeed, variation in accepted clinical practice is a major issue facing health care today (Timmermans & Mauck, 2005).

Other examples of incorporating EBP into daily patient care can be easily found in the literature. For example, the clinical question may be posed: "Should sterile physiologic saline be instilled into an endotracheal tube before suctioning to thin secretions and increase oxygenation?" Instillation of sterile physiologic saline into an endotracheal tube before suctioning is a long-standing practice of both nurses and respiratory therapists (Rauen, Chulay, Bridges, Vollman, & Arbour, 2008). However, research has shown the introduction of sterile physiologic saline into an endotracheal tube may lead to decreased oxygenation and increased occurrence of ventilator-associated pneumonia (Sole et al., 2003). Yet results from a multisite study showed 74% of hospitals had written policies to instill sterile physiologic saline into endotracheal tubes before routine suctioning by nurses and respiratory therapists (Sole et al., 2003). A discrepancy such as this between EBP and actual practices reinforces the need for increased use of EBP into all medical professions, including CRNAs.

EBP use in healthcare

EBP is the gold standard for providing safe and compassionate care (Stichler et al., 2011). In 1998, the IOM National Roundtable on Health Care Quality identified issues related to measuring, assessing, and improving the quality of health care in the United States. They classified the serious, widespread problems as underuse, overuse, or misuse of interventions (Chassin & Galvin, 1998). Implementing EBP provides a strong scientific foundation for clinical practice, achieving consistency, efficiency, effectiveness, and increased quality and safety in care

(Timmermans & Mauck, 2005). One major example of successful implementation of EBP into healthcare is cardiopulmonary resuscitation (CPR) guidelines. In the 1970's, EBP standards emerged as CPR. Prior to this, health care providers were trained based on limited research data and expert opinion. Through EBP, a standardized approach to CPR was incorporated across all healthcare disciplines (White & Dudley-Brown, 2012).

Empirical findings can be combined into a plan of care often referred to as clinical practice guidelines, (Scott, Grimshaw, Klassen, Nettel-Aguirre, & Johnson, 2011) protocols, or checklists, (Low et al., 2012) and are usually written for specific patient scenarios. Converting the research into useful, relevant care plans requires experienced practitioners (Timmermans & Mauck, 2005). Protocols should be flexible and adaptable, taking into account costs and making provisions for patient preference (National Health and Medical Research Council, 1999). With the use of EBP and protocols comes a stronger scientific foundation for the care given. Consistency, efficiency, safety, quality, and effectiveness are achieved. All disciplines of healthcare, including nurses, physicians, and allied health, use EBP to improve health care quality (Timmermans & Mauck, 2005).

EBP use in the hospital

Use of evidence-based practice within the nursing profession is a key component to hospitals attaining the coveted American Nurses' Credentialing Center's Magnet® status (Melnyk, 2007). A subsidiary of the American Nurses Association, the American Nurses Credentialing Center promotes excellence in nursing and healthcare globally through credentialing programs. Healthcare organizations that achieve Magnet® status demonstrate superior nursing practices and outcomes by identify excellence in nursing care delivery,

supporting professional practice to promote quality, and promoting best practices in nursing services (American Nurses Credentialing Center, 2013a). National assessments of competence utilize Magnet designation to rank and report the best healthcare organizations (American Nurses Credentialing Center, 2013b). The practice environment of nurses has been shown to be a determining factor of patient outcomes (Cheung, Aiken, Clarke, & Sloane, 2010). Positive work environments for nurses, including adequate staffing, high job satisfaction, low levels of burnout and low turnover rates, are attributes of Magnet® designated facilities (Cheung et al., 2010).

Education of nurses has also been linked to patient outcomes. An increase in baccalaureate nurses results in decreased surgical patient mortality (Aiken, Clarke, Cheung, Sloane, & Silber, 2003). In fact, recent sources of evidence of the National Magnet® Conference show after June 1, 2013, Magnet® facilities will demonstrate evidence of progress toward having 80% of registered nurses obtain baccalaureate or graduate degrees by 2020 (American Nurses Credentialing Center, 2013b).

The American Association of Nurse Anesthetists (AANA) is the professional association of CRNAs and student registered nurse anesthetists (American Association of Nurse Anesthetists, 2011a). In 2007, the AANA Board of Directors charged the AANA Practice Committee to develop a policy to advance EBP. Practice-related documents are created or revised with systematic analysis of the best available evidence to add to the body of knowledge of nurse anesthesia (Theimann & McFadden, 2010).

Best EBP can be utilized during common procedures in a hospital setting with the use of checklists, especially among CRNAs, RNs, and physicians. Providers create protocols to follow based on best evidence, and checklists remind them to include all steps, improving patient safety

(Gawande, 2009). Common patient outcomes improved through the use of EBP checklists include decreased blood transfusion reactions, decreased incidence of wrong patient or wrong limb operations, decreased incidence of ventilator-associated pneumonia, and decreased rates of infection (Pronovost et al., 2006). Implementation of EBP in the OR also results in overall improved patient outcomes (Ciaschi et al., 2011; Griffiths et al., 2012).

The AANA Practice Committee defines EBP as the "integration and synthesis of the best research evidence with clinical expertise and patient values" (Theimann & McFadden, 2010). Best research evidence is clinically relevant data, information, and research from medicine and nursing. Patients' values are concerns and expectations which providers must integrate into the decision making process. A provider uses his or her clinical skills and experiences to provide optimal care (Straus et al., 2011).

The relationship between nurses' perceived knowledge and beliefs about EBP and the extent of EBP in their daily practice has been studied (Melnyk, Fineout-Overholt, Feinstein, Sadler, & Green-Hernandez, 2008). However, little has been researched with the use of EBP, attitudes, and barriers, in anesthesia providers.

EBP is the combination of research evidence, patient characteristics, and provider experience. The implementation of EBP has proven to increase patient outcomes. Barriers to use of EBP include lack of time, unfamiliarity with statistical analyses found in research literature, and fear of loss of autonomy. Studies of attitudes of CRNAs and barriers to practice of EBP have not been reported in the literature. Assessing attitudes and barriers is necessary to ensure any future educational intervention to promote EBP is productive.

CHAPTER III

Methodology

This chapter summarizes the methodology of this descriptive correlational study to assess the attitudes toward and barriers and facilitators to the use of evidence-based practice.

Study Design

A descriptive correlational Internet based study was conducted. A secondary, qualitative portion of the study included interviews with a percentage of the respondents regarding their personal thoughts and views on the inclusion of EBP into their practice of anesthesia.

Sample, Setting, and Inclusion Criteria

All CRNAs in Georgia who are members of the AANA were recruited for this study. There were 1,132 CRNAs in Georgia at the time of the survey, which included 165 active, certified members, 852 active recertified members, 15 Life/Emeritus members, 65 student associate members, 33 inactive members, and two student graduate members. Over 90% of CRNAs in the United States are members of AANA. Only 962 CRNAs, those with an email address on file with AANA, were surveyed. All participants in the study were required to speak and understand English.

Exclusion Criteria

Georgia CRNAs who are not members of AANA were included in the survey. Also, Georgia CRNAs who did not have, or have not provided an email address to AANA were excluded.

Recruitment

A recruitment invitation was emailed to all CRNAs with a physical address in Georgia by the AANA Research Department. This email included an endorsement letter from the Researcher

and Committee Chairperson that states this study was reviewed and approved by the AANA. This email provided a link to the electronic survey for two weeks for the participant to complete. One reminder email was sent by AANA. A copy of the recruitment letter is included in Appendix A.

Variables and Instruments

The following items were included in the survey: Participant Demographic and Characteristics Form (Appendix B), the BARRIERS to Research Utilization Scale (Appendix C), and the Evidence-Based Practice Questionnaire (Appendix D).

Participant Demographics and Characteristics

The demographic and characteristics tool design was based on previous studies of barriers to implementation of EBP (Hutchinson & Johnston, 2004). The tool collected the following information from respondents: age, gender, ethnicity, level of education, year of graduation from a CRNA program, type of primary job facility, medical supervision, urban or rural location, and ease of access to Internet for research purposes.

CRNAs' Knowledge and Attitudes

CRNAs' knowledge and attitudes about evidence-based practice were measured using the Evidence-Based Practice Questionnaire (EBPQ) (Upton & Upton, 2006). The EBPQ is a 24-item questionnaire that consists of three sub-scales: practice, knowledge/skills, and attitude. Participants ranked statements on a seven point Likert-type scale from never (0) to frequently (7) (Upton & Upton, 2006). The statements included formulating questions, researching evidence, critically appraising literature, integrating the evidence into practice, evaluating outcomes, and sharing information with colleagues (Upton & Upton, 2006). Reliability (Cronbach's alpha of 0.87) and construct validity were established by the original authors with a study of 751 nurses

of various specialties across Wales (Upton & Upton, 2006). EBP use subscale reliability was .85, EBP attitude subscale reliability was .79, and knowledge/skills associated with EBP subscale was .91 (Upton & Upton, 2006). This questionnaire measures the variables of attitude and knowledge that have been shown to be related to Lewin's unfreezing phase of change.

CRNAs' Perceived Barriers and Facilitators

Participant perceptions of barriers and facilitators to use of EBP will be measured with the BARRIERS to Research Utilization Scale. The BARRIERS to Research Utilization Scale (Funk, Champagne, Wiese, & Tornquist, 1991a) is a 29 item assessment tool used extensively in research (Fink, Thompson, & Bonnes, 2005; Funk, Champagne, Wiese, & Tornquist, 1991a; Hutchinson & Johnston, 2004; Upton & Upton, 2006; Stichler, Fields, Kim, & Brown, 2011). Fink, Thompson and Bonnes (2005) surveyed over 200 nurses at a university-affiliated hospital. Hutchinson and Johnston (2004) surveyed over 300 nurses at a major university hospital in Melbourne, Australia. Using a Likert-type Scale, the tool ranks four factors: Factor 1: characteristics of the potential adopter, Factor 2: characteristics of the organization in which the research will be used, Factor 3: characteristics of the innovation of research, and Factor 4: characteristics of the communication of the research (Funk, Champagne, Wiese, & Tornquist, 1991b). Characteristics of the adopter include not seeing the value of research and lacking the willingness to change or try new ideas (Funk et al., 1991b). Characteristics of the organization are lack of willingness of administration to allow implementation of EBP, feeling one does not have enough authority to change patient care procedures, or feeling there is not enough time during the work day for reading research (Funk et al., 1991b). Characteristics of the innovation include conflicting reports in the literature, methodological inadequacies of the research, and lack of research replication (Funk et al., 1991b). Characteristics of the communication are

unclear implications for practice, statistical analysis not understandable, and research not reported clearly and readably (Funk et al., 1991b). Internal reliability for factors one through four are .80, .80, .72, and .65 respectively. Content validity was established by a second measure of research utilization and feedback from experts in the field (Funk et al., 1991b).

Qualitative Interviews

The interviews with individual anesthetists focused on the following questions.

Qualitative question 1: What does EBP means to you?

Qualitative question 2: Do you think about EBP? What do you think about EBP?

Qualitative question 3: How would increasing utilization/utilizing EBP change your anesthesia practice?

Qualitative question 4: What types of activities do you engage in presently to ensure your practice is kept up to date?

Protection of Human Subjects

The proposal for this research was approved by the Institutional Review Board of Georgia College and the AANA. Implied consent was given when respondents agreed to take the survey. No identifiable information was collected through this Internet based survey. The expected length of time to finish the survey was less than 30 minutes and did not place an undue burden on participants. There was no anticipated harm to the participants, and the researcher completed the National Institutes of Health Office of Extramural Research "Protecting Human Research Participants" web-based training course. The certificate is provided in the Appendix E.

Data Collection Procedures

An emailed invitation was sent from AANA to all CRNAs residing in Georgia who had

provided email addresses to AANA. The email contained an invitation to participate in the survey along with the link to complete the survey online. A reminder email was sent from AANA after 7 days from the original email in an attempt to increase participation. Participants completed the survey via the Internet at a time convenient to the participant within the availability period of two weeks. As the surveys were completed anonymously, data was de-identified and available for insertion into a statistical program for analysis. This researcher, along with a research team comprised of three doctorally prepared healthcare providers, analyzed the data as described below.

Individual CRNAs were contacted by the researcher and interviews performed and recorded. CRNAs from different practice settings were interviewed: university hospital settings, small, rural hospital settings, independent sole practitioner, and surgery center settings. The interviews were transcribed and contents evaluated.

Internal Validity

Identical emails were sent to all participants ensuring no variability in directions or administration of the survey. There was no intervention planned, therefore the responses from the participants cannot be presumed to originate from any extraneous variables, and only one researcher received the collected data from AANA.

Analysis Plan for Research Questions

Clinical Question 1: What are CRNAs' common attitudes to implementation of EBP? The Evidence-Based Practice Questionnaire was used to assess practice, knowledge/skills, and attitudes of EBP.

Clinical Question 2: What are CRNAs' common perceived barriers that discourage implementation of EBP? Clinical Question 3: What are CRNAs' common perceived facilitators

that encourage implementation of EBP? Barriers and facilitators to implementation of EBP were assessed using the BARRIERS to Research Utilization Scale. Descriptive statistics and measures of dispersion were utilized to analyze the data.

Clinical Question 4: Is there a relationship between perceived barriers to the implementation of EBP and demographic variables (CRNAs' age, gender, ethnicity, level of education, number of years as a CRNA)? Clinical Question 5: Is there a relationship between perceived barriers to implementation of EBP and CRNAs' practice environments, type of primary job facility, medical supervision, independent contractor, urban or rural location, and ease of access to Internet for research purposes? Clinical questions 4 and 5 were answered using the BARRIERS scale. Correlational statistics were utilized to analyze the relationships between participant demographics and barriers to implementation of EBP.

Clinical Question 6: How large an effect does use of formal, written practice guidelines such as those generated by physician organizations, insurance companies or HMOs, or government agencies have on CRNAs' practice of anesthesia? Clinical question 6 was answered using data derived from the demographic portion of the survey and descriptive statistics were reported.

Summary

This chapter describes the methodology proposed to conduct the research study. The following sections were discussed: study design, sample, setting, methods used to protect human subjects, instruments used to measure the study variables, data collection procedures, and data analysis plan.

Chapter IV

Results

The results of this descriptive correlational study assessing CRNAs' attitudes toward and barriers to the use of evidence-based practice are discussed in this chapter. Findings reported here include descriptive information concerning qualitative data from personal interviews with CRNAs, participant demographics, as well as quantitative data collected from the electronic survey. Reliability of the instruments and data addressing the research questions are also included.

Qualitative Interviews

Between June and August 2013, face to face and telephone conversations were conducted with CRNAs (N=14). Participants were asked to define evidence-based practice, describing what evidence-based practice means to them. They were questioned regarding any recent changes in practice and the reason for that change. Finally, participants were asked how they obtain the required continuing education requirements. All interviews were audiotaped with participant permission to ensure accuracy during transcription.

Sample Description

Fourteen qualitative interviews were conducted with CRNAs within the state of Georgia. The purposive sample of CRNAs known to the researcher was chosen for differing years of experience and work locations. Specifically, the researcher wanted to interact with CRNAs of varying years experience in a variety of anesthetizing locations and situations. This offered a comparison of inexperienced to experienced CRNAs' views of EBP. Also, differences between rural, urban, and medical direction combinations (CRNA/surgeon, CRNA/proceduralist, CNRA/anesthesiologist) could be explored. One participant in the electronic EBP survey

contacted this researcher with a question and agreed to participate in the qualitative research as well.

The mean age of participants was 42 (SD 10.55) years, with a range of 31 to 65 years. The mean years of CRNA experience was 10.5 years, with a range of less than one year to 37 years. Practice settings consisted of urban university based hospitals, rural hospitals with less than 200 beds, and surgeon-owned surgical centers. Medical supervision as required by Georgia law was provided by anesthesiologists, surgeons, and proceduralists.

Responses were grouped by number of years as a CRNA (less than ten years and ten years or greater) with seven participants in each group. Three CRNAs had less than one year experience in a university based hospital. Three CRNAs had one, two, and three years experience respectively and were university based hospital employees. One CRNA with eight years experience was an independent contractor working in multiple rural sites without an anesthesiologist. The group with ten or more years experience was diversified in their work history. One worked ten years in two different university based hospitals. Two CRNAs worked in a rural gastroenterology office without an anesthesiologist. They had twelve and fourteen years experience respectively. Two CRNAs with over twenty years experience worked in rural settings, one with and one without anesthesiologists. The most experienced CRNA, with over thirty years experience, worked in an urban urology office without an anesthesiologist.

Evidence-Based Practice

Qualitative question 1: What does EBP means to you?

Qualitative question 2: Do you think about EBP? What do you think about EBP?

Participants' responses to Questions 1 and 2 related to their thoughts on EBP. They were encouraged to answer to the best of their ability; there were no right or wrong answers.

Experienced CRNAs (those with greater than 10 years experience) were less likely to have a textbook definition of EBP. One (with over 20 years experience) was unaware and stated, "I don't even know what it is. You need to tell me what it is." A CRNA in solo practice for 8 years in a rural setting states in response to: What do you think about EBP, or do you think about it? "No, not really. I just try to keep them comfortable and not nauseated at the end. I'll be honest, I read a lot more when we had students coming in because I wanted to be able to answer their questions."

Only two experienced participants provided textbook descriptions of EBP. One CRNA with 10 years experience stated, "It is using literature and research and studies to guide your practice so it's not based on what you think should be done, it's based on empirical evidence". Another CRNA with over thirty years experience defined EBP as "incorporating the results of research and studies into your daily anesthesia practice."

Most CRNAs with less than 10 years experience gave textbook definitions of EBP. "Evidence-based practice is the use of knowledge from randomized control trials, reported in peer-reviewed journals. This should guide your practice", and "Evidence-based practice is the combination of using what you know with what has been found in research studies and also taking into consideration the patient's wishes as much as possible" were two answers given.

Reasons for Changing Clinical Practice

Qualitative question 3: How would increasing utilization/utilizing EBP change your anesthesia practice?

Participants were asked about recent changes in practice. The researcher attempted to discover if participants who were exposed to EBP used it to support a change in practice. Some participants indicated evidence-based research as the impetus for change. However, other

reasons included a lack of resources, preference of the anesthesiologist, information gleaned on patient follow up, or information provided by a colleague.

CRNAs who were recent graduates or who were in new areas of work expressed more use of research and evidence-based practice to guide their practice. CRNAs with less experience often used their textbooks as resources for a new technique or drug dosage. One CRNA with two years experience reported using phenylephrine rather than ephedrine in obstetrical patients based on information she learned from a textbook. All new graduates stated they practiced as they were taught in school. A new graduate stated, "I just got out of school, so I have no experience, so everything I do is evidence-based because I just learned it in school." A CRNA with two years experience stated, "I've just started doing hearts, so there's a lot of stuff that I'm doing differently, just because of that. I've done a ton of reading to refresh everything."

A CRNA stated a national shortage of Fentanyl required her to change her practice to use Sufenta. The participant based the dosages on information from colleagues who were familiar with the drug and used it daily in their practice. Other CRNAs who practiced at a small gastroenterology center changed their mode of practice due to location and lack of support personnel. These same CRNAs stated they used Versed and Fentanyl with a Diprivan infusion in the gastroenterology suite in a hospital with anesthesiologists present. These same CRNAs used only Diprivan when working solo (without an anesthesiologist) in the gastroenterology center.

CRNAs also changed practice due to the anesthesiologist's preference or used a drug dose based on the anesthesiologist's suggestion. One CRNA reported the anesthesiologists in her practice standardized pediatric doses for all ENT surgeries. CRNAs with differing levels of experience used other providers' techniques or drug dosages when changing something in their

practice. Differing levels of experience may account for this, as some drugs were not available when more experienced CRNAs were in training.

As work experience increased, some CRNAs reported a greater reliance on anecdotal evidence and self-evaluation of their own outcomes over research and evidence-based care. Additionally, being in a rural solo practice for some CRNAs was associated with less reliance on EBP and increased use of anecdotal evidence from their own practice. A CRNA with fourteen years in rural practice based medication use and dosage on anecdotal information received from the patients postoperatively. In her rural solo practice she saw patients preoperatively, administered the anesthetic, and saw them postoperatively. She describes her experiences, "…I could see how the anesthetic worked, you know, where I did well and where I did poorly, so that made a big difference." Another CRNA with over twenty years experience in rural practice stated, "I do my own critic of each case" and if there is something that "doesn't go perfect", then she considers making a change.

Spreading of evidence-based information can be informal, leading to a change in practice. Colleagues share information with each other and across professions. Two CRNAs, with one and ten years experience respectively, cited an informal email from another discipline (perfusionist) to alert of a warning related to the use of hetastarch with patients during open heart procedures. Because of the perfusionist's diligence, information was passed on to anesthetists who in turn changed their practice.

Continuing Education

Qualitative question 4: What types of activities do you engage in presently to ensure your practice is kept up to date?

Participants were asked to describe their continuing education efforts. CRNAs reported conference attendance and subscriptions to journals such as *Current Reviews for Nurse Anesthetists* and *AANA Journal* to obtain continuing education credits. A CRNA in a solo rural practice stated: "I, unfortunately because initially in my practice it was just myself, …I was unable to really leave, so I did a lot of Current Reviews. And I did attend some conferences. You know, now, a little bit further along in my career I started to attend more conferences." Another CRNA of twenty years in rural practice shared her reason for using Current Review and no longer attending conferences. "Well, I used to go to the seminars, and listen to how different people did different things, but I just look at my results, and I'm my world's worst critic. I do the Current Reviews."

Qualitative data was collected from interviews with CRNAs of differing years experience and practice settings. With the exception of one, CRNAs with less than ten years experience were more likely to rely on evidence-based practice. Recent graduates of CRNA programs reported using the evidence-based practice they were taught. Overall, more experience CRNAs (with over ten years experience), were less likely rely on evidence-based practice to change their practice. In contrast to new graduates, these more experienced CRNAs reported using other sources as information leading to a change in practice. These included colleagues and anecdotal information from their own or other CRNA's practice.

Quantitative Survey Data

The Research Department of the American Association of Nurse Anesthetists distributed nine hundred sixty-two electronic surveys to Georgia CRNAs with email addresses. One week later, a reminder email was sent by AANA. The survey remained active for two weeks, an adequate response time set by the committee. After two weeks, ninety-two respondents (response

rate of 9.5%) had completed or partially completed the three-part survey posted on Survey Monkey.

Sample Description

Table 1 summarizes descriptive statistics for study participants. Participants' ages ranged from 25 years to 74 years, with the majority being either 35-44 years old (28.3%) or 55-64 years old (28.3%). Only five percent of participants were 65 to 74 years of age. The majority of participants were female (55.4%) and White (69.6%). This sample is representative of CRNAs nationwide in terms of demographics based on an AANA Member Survey (AANA, 2011b).

Table 1

Demographic Characteristics

Characteristic	***n***	**(%)**
Age (years)		
25 to 34	12	(13.0%)
35 to 44	26	(28.3%)
45 to 54	23	(25.0%)
55 to 64	26	(28.3%)
65 to 74	5	(5.4%)
Race/Ethnicity	***n***	**(%)**
White	64	(69.6%)
African American	5	(5.4%)
Asian	2	(2.2%)

Other	1	(1.1%)
Hispanic or Latino	3	(96.7%)
Highest Level of Education		
Diploma	20	(21.7%)
Masters Degree	69	(75.0%)
Doctorate	3	(3.3%)
	M (SD)	
Years as CRNA	16.4 (11.8)	

Primary Practice Descriptors

A total of 72 participants identified the type of primary practice in which they currently work. Because participants were asked to select all descriptors that applied to their practice group, categories were not mutually exclusive. Table 2 presents primary practice type information, which was then compared to factors from the BARRIERS scale. The type of employment for CRNAs varied, with the majority indicating employment with an anesthesiology group, a hospital/surgical facility, or as an independent contractor. Participants equally reported working in urban and rural settings. CRNAs reporting "more than one" or "other" practice type were combined into one category of thirteen (16.7%) for statistical analyses.

Table 2

Primary Practice Type Statistics

Primary Practice Type	*n*	(%)
Employee of an anesthesiology group	25	(27.2%)
Employee of a CRNA group	8	(8.7%)
Employee of hospital/surgical facility	20	(21.7%)
Independent contractor	24	(26.1%)
More than one	10	(10.9%)
Other	3	(3.3%)
Urban	19	(20.7%)
Rural	19	(20.7%)

Clinical Questions and Instruments

Clinical Question 1

Clinical Question 1 asks, "What are CRNAs' common attitudes to implementation of EBP?" The Evidence-Based Practice Questionnaire quantified attitudes to implementation of EBP.

Evidence-Based Practice Questionnaire

Common attitudes to implementation of EBP were assessed with the Evidence-Based Practice Questionnaire. Participants rank statements on a seven point Likert-type scale from never (0) to frequently (7), with a higher score of a possible 168 indicating a more positive attitude towards use, effectiveness, and knowledge of EBP (Upton & Upton, 2006). Upton and Upton's (2006) 24 item Evidence-Based Practice Questionnaire for nurses uses three subscales to

assess use of EBP, attitudes toward EBP and knowledge of EBP. Three different issues are important when using a self-reporting tool to assess EBP: the frequency in which the steps to access EBP are applied in patient care, the individual's attitude toward EBP, including perceived barriers such as workload, and personal judgments on the value of EBP (Upton & Upton, 2006). There is also self-rating of skills to implement EBP, including use of information technology, interpreting literature, and applying it to patient care (Upton & Upton, 2006). Overall tool reliability in this study was .94. Means of each subscale relate the participant's overall outlook on EBP. Overall total mean score is 4.92, and overall scale mean is 119.63 of a possible 168, reflecting a positive use, attitude, and knowledge/skill level of EBP. Table 11 shows descriptive statistics for EBPQ.

Table 11

Descriptive Statistics for EBPQ

EBPQ	EBPQ Use Subscale	EBPQ Attitudes Subscale	EBPQ Knowledge/Skills Subscale	EBPQ Total Score Mean
n	67	67	66	67
Range of possible scores	1.00 to 7.00	1.00 to 7.00	1.00 to 7.00	1.00 to 7.00
Observed range	1.00 to 7.00	3.00 to 7.00	2.14 to 6.64	2.40 to 6.54
Mean	4.84	5.31	4.88	4.92
Standard error of mean	.167	.124	.128	.114

The EBP Use Subscale consists of 8 questions assessing CRNAs' actual implementation of evidence-based practice. Participants were questioned on their frequency of creating questions

to address gaps in their knowledge, and researching that information. They were asked frequency of critically appraising literature and integrating the evidence into their own practice. Lastly, CRNAs were questioned relating to evaluating their outcomes and sharing that information with colleagues. Means of the Use Subscale therefore provides an idea of the likelihood of CRNAs implementing EBP. A mean of 4.84 was found in this study of GA CRNAs with Cronbach's alpha .91. This indicates a moderate use of EBP.

The Attitudes Subscale lists four opposing statements, and participants are asked to place themselves on a scale between the two. The first pair of statements compares a workload too great to keep up with new evidence with the importance of new evidence is such that time is made in the work schedule for reading. The second assesses CRNAs' attitudes to questions about their clinical practice. The third pair of statements ranks EBP from a waste of time to a fundamental part of professional practice. The fourth pair of statements ranks CRNAs' attitudes toward maintaining tried and true methods to changing practice because of evidence found. The higher mean of 5.31, with Cronbach's alpha .77 on the Attitudes Subscale reflects a more positive attitude toward EBP than any of the other scales measured. CRNAs in Georgia are more likely to have positive attitudes toward implementation of EBP.

The Knowledge/Skills Subscale is a group of 16 statements for self-reporting knowledge and skills related to the CRNA's ability to obtain and analyze research. These include converting information needs into researchable questions and obtaining, analyzing, applying, and sharing the knowledge with colleagues. The mean of 4.88 indicates an increased knowledge and skill of EBP with a Cronbach's alpha .95.

Clinical Question 2

Clinical Question 2 asks, "What are CRNAs' common perceived barriers that discourage implementation of EBP?"

BARRIERS to Research Utilization Scale

The BARRIERS scale consists of 29 items that identify four factors which identify potential barriers to research utilization. Factor 1 identifies barrier characteristics of the potential adopter; Factor 2 identifies barrier characteristics of the organization in which the research will be used; Factor 3 identifies barrier characteristics of the innovation or research; and Factor 4 identifies barrier characteristics of the communication of the research. Potential answers on the BARRIERS questionnaire range from one to five, and reflects the degree to which the item is perceived to be a barrier (1 = to no extent; 2 = to a little extent; 3 = to a moderate extent; 4 = to a great extent) with five equaling no opinion (Funk, et al., 1991b). According to scoring directions provided by the authors, participants with greater than or equal to 50% of items marked "no opinion" were not included in the overall mean of that item in each Factor (Funk, et al. 1991b). Therefore, the number of participants varied per item. Mean and standard error of the mean for the total scale were 2.37 and .059 respectively, indicating an overall perception of some barriers to research utilization. Specific information for each of the four factors is presented below.

Factor 1

Factor 1 measured the barriers characteristics of the adopter of the research; descriptive statistics for this factor are presented in Table 3. Funk, et al. (1991b) defined these characteristics as the nurse's research values, skills, and awareness. Cronbach's alpha in this study was .82 for Factor 1, indicating internal consistency for this factor.

Table 3

Factor 1 Descriptive Statistics

Descriptive Statistics	Factor 1 (n=69) Characteristics of the Adopter
Number of items	8
Range of possible scores	1.00 to 4.00
Observed range	1.00 to 3.50
Mean	2.14
Standard deviation	.53

Table 4 describes statistics for the eight items measured in Factor 1. A characteristic of the CRNA, "The nurse feels the benefits of changing practice will be minimal" is perceived to be a barrier to a moderate extent, with the highest mean (2.46). As a characteristic of the CRNA, "The nurse does not see the value for research in the practice" is perceived to be a barrier to a little extent with the lowest mean (1.78).

Table 4

Factor 1 Item Statistics

Factor 1 Characteristics of the Adopter	Mean (SD)	*n*
The nurse feels the benefits of changing practice will be minimal.	2.46 (.78)	68
There is not a documented need to change practice.	2.37 (.79)	68
The nurse does not feel capable of evaluating the quality of the research.	2.30 (.83)	68
The nurse sees little benefit for self.	2.00 (.87)	69
The nurse is unwilling to change/try new ideas.	1.87 (.93)	68

The nurse does not see the value of research for practice.	1.78 (.91)	69

Factor 2

Factor 2 measured the barriers characteristics of the organization. Funk, et al. (1991b) defined these characteristics as the settings, BARRIERS, and limitations of the facility. Cronbach's alpha in this study was .84 for Factor 2, indicating internal consistency for the factor. Table 5 describes Factor 2 statistics.

Table 5

Factor 2 Descriptive Statistics

Descriptive Statistics	Factor 2 (n=70) Characteristics of the Organization
Number of items	8
Range of possible scores	1.00 to 4.00
Observed range	1.38 to 4.00
Mean	2.60
Standard deviation	.65

Table 6 describes statistics for the eight items measured in Factor 2. As a characteristic of the organization, "Administration will not allow implementation", "Physicians will not cooperate with implementation", and "The nurse does not feel he or she has enough authority to change patient care procedures" are perceived barriers to a moderate extent, with the highest means of 2.76, 2.75, and 2.75 respectively. As a characteristic of the organization, "There is insufficient time on the job to implement new ideas" is perceived as a barrier to a little extent, with the lowest mean (2.31).

Table 6

Factor 2 Item Statistics

Factor 2 Characteristics of the Organization	Mean (SD)	*n*
Administration will not allow implementation.	2.76 (1.09)	67
Physicians will not cooperate with implementation.	2.75 (.97)	67
The nurse does not feel he or she has enough authority to change patient care procedures.	2.75 (1.04)	71
Other staff are not supportive of implementation.	2.63 (.87)	67
The nurse feels results are not generalizable to own setting.	2.51 (.82)	65
The facilities are inadequate for implementation.	2.43 (.98)	65
The nurse does not have time to read research.	2.40 (.86)	70

Factor 3

Factor 3 measured the barrier characteristics of the innovation. Funk, et al. (1991) defined these characteristics as the qualities of the research. Cronbach's alpha in this study was .82 for Factor 3, indicating internal consistency for this factor. Table 7 describes Factor 3 statistics.

Table 7

Factor 3 Descriptive Statistics

Descriptive Statistics	Factor 3 (n=64) Characteristics of the Innovation
Number of items	6
Range of possible scores	1.00 to 4.00

Observed range	1.25 to 3.50
Mean	2.32
Standard deviation	.57

Table 8 describes statistics for the six items measured in Factor 3. As a characteristic of the innovation, "The literature reports conflicting results" is perceived as a barrier to a moderate extent, with the highest mean (2.54). As a characteristic of the innovation, "The research reports/articles are not published fast enough" is perceived as a barrier to a little extent, with the lowest mean (2.16).

Table 8

Factor 3 Item Statistics

Factor 3 Characteristics of the Innovation	Mean (SD)	*n*
The literature reports conflicting results.	2.54 (.79)	61
The research has not been replicated.	2.44 (.86)	62
The research has methodological inadequacies.	2.42 (.74)	55
The nurse is uncertain whether to believe the results of the research.	2.28 (.89)	69
The conclusions drawn from the research are not justified.	2.23 (.78)	62
Research reports/articles are not published fast enough.	2.16 (.97)	63

Factor 4

Factor 4 measured the barriers characteristics of the communication. Funk, et al. (1991) defined these characteristics as presentation and accessibility of the research. Cronbach's alpha

in this study was.78 for Factor 4, indicating internal consistency for this factor. Table 9 describes Factor 4 statistics.

Table 9

Factor 4 Descriptive Statistics

Descriptive Statistics	Factor 4 (n=68) Characteristics of the Communication
Number of items	6
Range of possible scores	1.00 to 4.00
Observed range	1.17 to 4.00
Mean	2.45
Standard deviation	.62

Table 10 describes statistics for the six items measured in Factor 4. As a characteristic of the communication, "Implications for practice are not made clear" is perceived as a barrier to a moderate extent, with the lowest mean (2.33). As a characteristic of the communication, "The relevant literature is not compiled in one place" is perceived as a barrier to a moderate extent, with the highest mean (2.66).

Table 10

Factor 4 Item Statistics

Factor 4 Characteristics of the Communication	Mean (SD)	*n*
The relevant literature is not compiled in one place.	2.66 (.82)	64
Research report/articles are not readily available.	2.56 (1.00)	68
The research is not reported clearly and readably.	2.56 (1.07)	68
Statistical analyses are not understandable.	2.46 (1.01)	66
The research is not relevant to the	2.36 (1.05)	67

nurse's practice.		
Implications for practice are not made clear.	2.33 (.82)	64

Clinical Question 3

Clinical Question 3 asks, "What are CRNAs' common perceived facilitators that encourage implementation of EBP?" The BARRIERS Scale provided opportunity for participants to write in their common perceived facilitators to encourage implementation of EBP. Participants suggested several facilitators to encourage implementation of EBP, which were grouped into five categories: facilitators involving the research, costs, access to research, practice setting, and personal facilitators.

Facilitators Involving Research

Facilitators involving the research included well-designed studies that support practice changes, clear, practical, and simple plans with patient benefit, and simplicity and validity of the research itself. CRNAs want easy access to simple, well-designed, valid, useful, patient-based research.

Facilitators Involving Cost

Facilitators of implementation of EBP involving costs included innovations or research that has monetary benefit or increases production. Another facilitator given was cost effective EBP implementation. CRNAs want implementation of new EBP that saves money and time and is cost effective to use.

Facilitators Involving Access

Facilitators involving access to EBP were better access to current research, Medline, and similar sites. Databases with meta analysis of research are needed for easier acquisition of

research on interesting topics. CRNAs find the present access to research lacking and desire better access.

Facilitators Involving Practice Setting

Facilitators to the use of EBP involving the practice setting were multi-faceted. They included open communication of current EBP, the desire for journal clubs or meetings, with time allotted on the job to discuss current EBP, or simply posting synopses of current research in common areas. Practicing in an academic facility with group agreement for the need of EBP and peers who utilize evidence-based findings in their practice are also seen as setting facilitators. In addition, support from the facility/hospital staff, administration, and physicians/anesthesiologists to implement new evidence-based changes would facilitate the process. One CRNA responded, "Some things I can implement in a singular way", but many things require "buy-in" from the facility and other staff to initiate.

Personal Facilitators

CRNAs listed personal facilitators to the use of EBP. They included setting personal goals of bettering care, willingness to change, identifying areas of need, and offering continuing education units for research of EBP. In addition, the ability to extrapolate finding to present practice and practice population and desire for patient safety were personal facilitators to the use of EBP.

Clinical Question 4

Clinical Question 4 asks, "Is there a relationship between perceived barriers to the implementation of EBP and demographic variables (CRNAs' age, gender, ethnicity, level of education, and numbers of years as a CRNA)? The BARRIERS scale was used to identify

potential relationships between participants' demographics and each factor of the scales. Table 11 shows correlations among demographic variables and BARRIER subscales.

Table 11

Participants' Demographics and Factors of the BARRIERS Scales

Barriers Scale	Age	Gender	Race	Level of Education	Number of years as CRNA
Factor 1 Adopter	r=.216, n =69 p=.074	r=-.515, n=69 p= -.080	r=-.045, n=52 p= .754	r=-.336, n=69 p= .005+	r= .274, n= 69 p=.023+
Factor 2 Organization	r=-.059, n=70 p=.629	r=-.210, n=70 p=.080	r=-.031, n=53 p= .826	r= -.086, n=70 p= .481	r=-.071, n= 70 p= .560
Factor 3 Innovation	r=.070, n= 64 p=.582	r=.023, n=64 p= .859	r=-.053, n=47 p= .723	r=-.063, n=64 p= .619	r=.093, n= 64 p= .464
Factor 4 Communication	r=-.047, n= 68 p=.704	r=-.062, n=68 p= .614	r=.0.54, n=51 p= .707	r=-.117, n=68 p=.342	r=-.002,n= 68 p=.986

+ significant for $p<.05$

A Pearson product-moment correlation coefficient was computed to assess the relationship between age, gender, and race of CRNA and each of the 4 factors of the BARRIERS scale. There was a significant and positive correlation between Factor 1 (characteristics of the CRNA) and CRNA experience ($r = .27$, $n = 69$, $p = .02$), indicating that more experienced CRNAs perceived greater Factor 1 barriers to utilization of EBP. There was also a significant and negative correlation between Factor 1 (characteristics of the CRNA), and level of education ($r = -.34$, $n=69$, $p=.005$), indicating that as CRNA education increases, perceived Factor 1 barriers to utilization of EBP decrease.

Clinical Question 5

Clinical Question 5 asks, "Is there a relationship between perceived barriers to implementation of EBP and CRNAs' practice environments, type of primary job facility, medical supervision, independent contractor, urban or rural location, and ease of access to Internet for research purposes?"

A Pearson product-moment correlation coefficient was computed to assess the relationship between practice environment/type of primary job facility, urban versus rural practice sites, ease of access to the Internet for research purposes and each of the four Factors of the BARRIERS scale. Table 12 shows correlations between these demographic portions of the questionnaire and the four Factors. No statistical significance was found in relationships between practice environment/type of primary job facility, urban versus rural practice sites, and ease of access to the Internet from research purposes and each of the BARRIERS four Factors. Of the 90 participants who answered the question, sixty-two (68.89%) stated they had very easy Internet access.

Table 12

Patient Demographics and Factors of the BARRIERS Scale

Barriers Scale	Practice environment/ type of primary job facility	Urban vs. Rural	Ease of access to Internet for research purposes
Factor 1 Adopter	r=.093, n= 69 p=.446	r= .114, n=32 p= .535	r= .093, n= 69 p= .449
Factor 2 Organization	r= -.036, n= 71 p= .766	r= .238, n=33 p= .182	r= .188, n= 70 p= .120
Factor 3 Innovation	r= .180, n= 69 p=.138	r= .049, n=32 p= .791	r= .008, n= 64 p= .950
Factor 4 Communication	r= -.030, n=69 p= .804	r=-.058, n=32 p= .751	r= .026, n= 68 p= .836

Clinical Question 6

Clinical question 6 asks, "How large an effect does use of formal, written practice guidelines such as those generated by physician organizations, insurance companies or HMOs, or government agencies have on CRNAs' practice of anesthesia?" Guidelines from American Society of Anesthesiologists (ASA), AANA, and Centers for Medicare and Medicaid (CMS), as well as individual practice facility guidelines serve to ensure patient safety. Participants were asked if they followed guidelines from these agencies and to what extent those guidelines affected their practice. The response set of (1) no effect, (2) somewhat of an effect, (3) moderate effect, (4) strong effect, and (5) very strong effect was used. Table 15 shows statistics of guideline use by CRNAs.

Table 15

Guideline Use Statistics

	Who use AANA guidelines	Who use practice facility guidelines	Who use ASA guidelines	Who use CMS guidelines
CRNA participants	*n*=85 (97.70%)	*n*=77 (88.51%)	*n*=78 (86.67%)	*n*=66 (75.86%)
Extent of effect on CRNAs' practice	68.5% strong or very strong effect	58.7% strong or very strong effect	38% strong or very strong effect	38% strong or very strong effect

AANA guidelines were both the most often used (97.7%) and had the strongest effect on practice (68.5% strong or very strong effect). Nearly the same number of participants used ASA (*n*=78, 86.67%) and practice facility guidelines (*n*=77, 88.51%). Only 75.86% of participants used CMS guidelines.

Chapter V

Introduction

Chapter V presents a discussion of the findings and conclusions of study results. Outcomes will be compared to findings from previous studies. Also included are discussions of use of the EBPQ and BARRIERS Scale, the study limitations, and strengths of the study. Finally, implications for CRNAs' practice and suggestions for future research will be presented.

Groundbreaking publications such as *To Err is Human* (Committee on Quality of Health Care in America, 2000) and *Crossing the Quality Chasm* (Committee on Quality of Health Care in America, 2001) have provided nursing and the medical community with opportunities to greatly improve patient outcomes. A comprehensive approach to improving patient safety includes decision making that is evidence-based on the best available scientific knowledge (Committee on Quality of Health Care in America, 2001) and should not vary based on provider preference. In order to provide patients with the best available, evidence-based care, attitudes toward and barriers to the use of evidence-based nursing anesthesia practice must be assessed. Only after determining these attitudes and barriers can the profession of nurse anesthesia truly ensure evidence-based anesthesia practice for all patients. The purpose of this study was to determine the attitudes and barriers as a first step to advancing EBP in nursing anesthesia.

Participants in the current study were predominantly white with slightly more females. The AANA Member Survey Data (AANA, 2011b), conducted by the AANA and reported in November 2011, reports similar demographic statistics as the present survey. This national data on CRNAs is similar to findings of CRNAs in Georgia. Because the demographics of Georgia CRNAs are similar to AANA survey demographics, this information could be extrapolated to other states.

Quantitative Results

Clinical Question 1: Attitudes

EBPQ

The EBPQ was developed to measure attitudes towards, knowledge of, and implementation of EBP of nurses (Upton & Upton, 2006). To date the EBPQ has not been used to assess CRNAs. CRNA attitudes are important to assess in the uptake of new guidelines and practices because acknowledging knowledge deficits and misconceptions of EBP is one of the most crucial initial steps that must occur in the process of EBP implementation (Jennings-Sanders, Jury, & Burant, 2011). Some federal agencies are linking federal grants to translational research (Bellamy, Bledsoe, & Traube, 2006), reinforcing the need for the translation of research into clinical practice.

All 24 items on the EBPQ were scored on a scale of 1–7, with a higher score indicating a more positive attitude towards EBP, or use and knowledge of EBP (Upton & Upton, 2006). The EBPQ was used to assess social workers (Rice, Hwang, Abrefa-Gyan, & Powell, 2010) and Veterans Administration nurses (Jennings-Sanders et al., 2011). Mean scores of EBPQ for CRNAs in the current study were higher than the mean scores of VA nurses (Jennings-Sanders et al., 2011), indicating that CRNAs in this study may have more positive attitudes towards EBP. Once explanation for this could be that the master's curriculum for the CRNA has more in depth research classes than that of bachelor's curriculum for RNs (Neft & Greenier, 2013). Mean score of EBPQ for CRNAs in this study was higher than social workers in EBP use subscale, similar on EBP knowledge subscale, and less than social workers on EBP attitude subscale (Rice et al., 2010). Social workers have experienced a slow start in implementing evidence-based practice (Mullen, Shlonsky, Bledsoe, & Bellamy, 2005), possibly accounting for their lower mean scores

for the use and knowledge subscales. Assessing attitudes, use, and knowledge of evidence-based practice is crucial because it predicts readiness to obtain research evidence to substantiate clinical practice (Jennings-Sanders et al., 2011).

Clinical Question 2: Barriers

BARRIERS Scale

The BARRIERS scale identified CRNAs' potential barriers to the use of evidence-based practice. Its four factors identify barrier characteristics of the CRNA, organization, innovation or research, and communication. Potential answers on the BARRIERS questionnaire range from one to five, and reflect the degree to which the item is perceived to be a barrier (1 = to no extent; 2 = to a little extent; 3 = to a moderate extent; 4 = to a great extent) with five equaling "no opinion" (S. Funk et al., 1991). The rank order was derived from the mean value of the items in each subscale, with higher values indicating greater perceived barriers.

In this study, CRNAs five greatest barriers across all subscales were "Administration will not allow implementation", "Physicians will not cooperate with implementation", "The nurse does not feel he or she has enough authority to change patient care procedures", "Other staff are not supportive of implementation", and "The relevant literature is not compiled in one place". Other research with CRNAs and the BARRIERS scale revealed five different greatest barriers (Palmer, 2013). This implies the presence of a wide variety of perceived barriers to implementation of EBP by CRNAs nationwide. This finding is not limited to the United States, as "The nurse does not feel he or she has enough authority to change patient care procedures" followed by "Statistical analyses are not understandable" were the top perceived barriers found in a survey of 2,600 nurses in Northern Ireland (Parahoo, 2000). Nurses' sense of autonomy and

significance in organizations should be addressed before attempts to implement EBP. Acknowledging known barriers and removing them before EBP initiatives will increase the likelihood of success of the change in practice.

In Factor 1, which addresses characteristics of the CRNAs (adopter), this study's participants' most commonly perceived barrier was minimal benefits of changing practice. Participants were least likely to perceive seeing the value for research in the practice as a barrier. This is somewhat illogical; CRNAs in this study saw the value in research but only minimal benefits to changing practice based on that research. One way to further investigate this phenomenon is to survey CRNAs before and after launching an evidence-based practice initiative. After an obtaining pre-implementation data on RNs' perceived barriers to use of research findings, an organization-wide research initiative was performed in a large university-affiliated Magnet hospital. Post-implementation data showed a decrease in all factors of the BARRIERS scale, with a significant decrease in the perceived barriers of the nurse (adopter) (Fink et al., 2005). Perhaps with further education CRNAs will see more benefit to changing practice based on EBP utilization.

In this study, Factor 2, characteristics of the organization, "Administration will not allow implementation", "Physicians will not cooperate with implementation", and "The nurse does not feel he or she has enough authority to change patient care procedures" were the highest perceived barriers. Similarly, nurses in a Magnet® community hospital reported four of the five top barriers to research utilization were related to the setting (Karkos & Peters, 2006). Therefore, implementations within organizations to increase use of evidence-based practice must address relations within the organization itself, such as improved attitudes from physicians and administration and increased voice of nurses.

In Factor 3, characteristics of the innovation, or the research itself, CRNAs in this study reported conflicting results in the literature as the most commonly occurring perceived barrier, and research not published fast enough as the least commonly occurring perceived barrier. Conflicting results in the literature was also the most commonly perceived barrier to the use EBP with surgeons (Knops, Vermeulen, Legemate, & Ubbink, 2009). Variation in practice should be differentiated from individualizing patient care. Moving away from best practice or a proven standard may promote poor outcomes and higher costs (Headley, 2012). CRNAs should be encouraged to examine all legitimate research and then choose the right care for their particular patient.

In Factor 4, characteristics of the communication, CRNAs in this study reported "The relevant literature in not compiled in one place" was the most commonly perceived barrier, a finding repeated in other studies of barriers (Bostrom, Kajermo, Nordstrom, & Wallin, 2008; Kocaman et al., 2010; Uysal, Temel, Ardahan, & Ozkahraman, 2010). Despite multiple findings of this barrier, there are sources of information online, although not all are anesthesia specific. The *AANA Journal* is the official scholarly publication of the AANA, and is available free online (American Association of Nurse Anesthetists, 2013a). Three times yearly, the Anesthesia Patient Safety Foundation (APSF) delivers the *APSF Newsletter* to anesthesia providers free of charge (Anesthesia Patient Safety Foundation, 2010). The Cochrane Collaboration presents the Cochrane Reviews, published in *The Cochrane Library,* a subscription based online collection of databases that reviews research on the effectiveness of healthcare treatments and interventions ("About the Cochrane Library," 2013). Often database access is restricted to subscribers only or through a university. Individual journal articles may be accessed online; abstracts are generally accessed freely, while the complete article may be purchased for a fee. PubMed Central is an

archive at the U.S. National Institutes of Health's National Library of Medicine of final, peer-reviewed author manuscripts by scientists and others who receive research funding from NIH and other funding agencies. Participating publishers contribute journal literature to this archive for free access (National Center for Biotechnology Information, 2011). CRNAs should familiarize themselves with sources and actively seek new information. Attempts to increase EBP in CRNAs should include not only the importance of reading relevant research but also methods to obtain it.

Clinical Question 3: Facilitators

Participants in this study were given the opportunity to write in facilitators to the use of EBP. Just as identifying and addressing barriers can promote research utilization, identifying and initiating facilitators can create momentum to increase EBP use. Facilitators to encourage the implementation of EBP were grouped into five categories: facilitators involving the research, costs, access to research, practice setting, and personal facilitators.

CRNAs in this study reported EBP would be facilitated by well-designed studies that support clear, practical, practice changes. Other nurses state that present research lacks clinical credibility and fails to offer the desired level of clinical direction (McCaughan et al., 2002). More clinically relevant research has also been reported as a facilitator to EBP use (Hutchinson & Johnston, 2004). Clear initiatives backed by research are needed to produce an effective change in practice.

In this study, monetary benefit was reported as a facilitator to increase use of EBP. As health care systems' shrinking budgets struggle to meet patients' needs, implementing cost-effective EBP becomes more important (Chapman, Lazar, Fry, Lassere, & Chong, 2011). CRNAs in this study seek innovations that decrease costs while ensuring patient safety. In order

for a new intervention to be used, clinical efficacy, cost–benefit and feasibility of the intervention must be established (Leach, 2006).

CRNAs in this study reported a need for better access to current research. Better access is a current theme in assessing barriers and facilitators to EBP implementation (Bostrom et al., 2008; Funk et al., 1991a; McCaughan et al., 2002; Theimann & McFadden, 2010). The *AANA Journal* brings research to CRNAs (Biddle & Hershkowitz, 2011), but EBP can only be helpful if useful and valid evidence exists, is accessed, and acted upon (Bogdan-Lovis & Sousa, 2006). Attempts to introduce or increase the use of EBP should include education on accessing literature. Another key to improving access to reference information is the wide range of textbooks and references on drugs available for desktop and even hand-held computers (Bates & Gawande, 2003).

In this study, suggestions for meetings and time allowed to share EBP were facilitators to EBP in the practice setting. CRNAs in this study called for more institutional and administrative support in providing access to EBP research, also seen in other BARRIERS studies (Funk et al., 1991a). Institutions and collaborative practice groups should evaluate policies and procedures in place and update as necessary (Sole et al., 2003). Regular monitoring at the institutional level of current best evidence would make key findings available without individuals needing to do large searches (Mullen et al., 2005). Proctor's (2004) methods to facilitate implementation of EBP in a practice setting include manuals, and some hospitals provide regular meetings of the anesthesia providers to discuss morbidity and mortality, current findings in the literature, and updates on drugs and equipment.

In this study, CRNAs' personal facilitators to the use of EBP included providing better patient care, and identifying areas of need or knowledge deficit. Bringing about acceptance of

EBP by practitioners is key to implementation (Proctor, 2004). All CRNAs have the "opportunity and responsibility to marshal meritorious research findings into clinical practice" making "better, safer, and more effective clinical practitioners" (Biddle & Hershkowitz, 2011, p. S5). This may include advancing one's education (Funk et al., 1991a) and offering continuing education units for research of EBP. As the evidence changes, CRNAs should continually strive to improve the care they deliver.

Clinical Questions 4 and 5: BARRIERS and CRNA demographics

Only two significant correlations were found between CRNA demographic characteristics and factors from the BARRIERS scale. There was a significant and positive correlation between Factor 1 (characteristics of the CRNA) and CRNA's years experience, indicating that more experienced CRNAs perceived greater Factor 1 barriers to utilization of EBP. Barriers included in Factor 1 are related to the nurse, such as "The nurse is unwilling to change/try new ideas" and "The nurse does not see the value of research for practice". No available research uses the BARRIERS scale with CRNAs, although nurses' characteristics were frequently perceived barriers in other studies (Parahoo, 2000; Knops et al., 2009). This is in contrast to the original authors' findings of weak relationships of little actual importance between number of years since nurses' licensure and BARRIERS scale (Funk et al., 1991a). CRNAs with more experience should make efforts to investigate EBP and guard against becoming complacent with patient care.

There was also a significant and negative correlation between Factor 1 (characteristics of the CRNA), and level of education, indicating that as CRNA education increases, perceived Factor 1 barriers to utilization of EBP decrease. Surgical patients treated in hospitals with higher proportions of nurses fair better; a 10 percent increase in the proportion of nurses holding

bachelor's degrees decreased the risk of patient death and failure to rescue by 5 percent (Aiken et al., 2003). If increased education improves attitudes toward EBP use, patients treated with EBP have better outcomes, and patients cared for by nurses with higher education have better outcomes, then plans to increase implementation of EBP should include advancing CRNA education, such as with the Doctorate of Nursing Practice degree.

Clinical Question 6: Guidelines

In this study, CRNAs were asked to rate the extent to which formal, written practice guidelines such as those generated by physician organizations, insurance companies or HMOs, or government agencies have on their practice of anesthesia. The Institute of Medicine has published *Standards for Developing Trustworthy Clinical Practice Guidelines (CPGs)* that address the need for transparency, management of conflict of interest, guidelines development group composition, use of systemic reviews, rating strength of recommendations, articulating, reviewing, and updating guidelines (Institute of Medicine, 2011). Adherence to practice guidelines generated from research results improves patient outcomes (Bunch, 2008), whereas use of non-recommended practices and variations in care may adversely affect patient outcomes (Ciaschi et al., 2011).

Guidelines from the two representative bodies (AANA and ASA) of anesthesia providers were followed most frequently by participants in this study. Increased reported use of these practice guidelines from AANA and ASA may be due to ease of availability on websites. The AANA provides Professional Practice Documents on its website to guide CRNAs to best evidence-based practice (American Association of Nurse Anesthetists, 2013b), and are products of the AANA Professional Practice Division. Evidence-based approach is integrated into the development or revision of all practice-related documents originating from the AANA Practice

Committee which require AANA Board of Directors' consideration for adoption (American Association of Nurse Anesthetists, 2012). The ASA's Policy Statement on Practice Parameters and Standards for perioperative patient care are available on their website and are open to the public (American Society of Anesthesiologists, 2012).

Following practice guidelines from one's own facility ranked lower than use of AANA and ASA guidelines in this study. Meta-analyses showed use of evidence-based clinical guidelines compared with usual care resulted in significantly reduced in-hospital complications with invasive interventions or surgical conditions, increased quality and quantity of documentation, and significantly reduced length of stay (Zhang & Liu, 2011). Sole et.al (2003) found that nurses wrote policies at most hospital sites and that preceptors' influence and knowledge obtained in their education impacted their practice the most.

Guidelines from CMS had the lowest use rating in this study, which could have implications for reimbursement. VA nurses have previously identified two primary reasons for not using guidelines: organizational characteristics and inadequate time or staffing or a heavy workload (Abrahamson, Fox, & Deobbeling, 2012). With new CMS guidelines tying reimbursement to outcomes (Centers for Medicare & Medicaid Services, 2013), anesthetists should ensure compliance with guidelines to obtain maximal payment.

Qualitative Interviews

Qualitative interviews with 14 CRNAs were conducted in this study to capture more personal attitudes toward EBP. CRNA readers may glean varying amounts of knowledge from statistical analyses, but hearing the story of other anesthetists from their viewpoint is especially compelling to readers. Stories of experiences and figures of speech provide much of the appeal in qualitative research (Sandelowski & Barroso, 2002).

Overall, CRNAs with less than ten years experience were more likely to correctly define EBP and verbalize its use in their education and practice in this study. In this study however, CRNAs with more than ten years experience were less likely to correctly define EBP or demonstrate its use in their anesthesia practice. Only two CRNAs with over ten years experience could define EBP correctly. New CRNAs often referred to their textbooks for guidance. This is similar to new RNs who use protocols to integrate new knowledge into their practice and aid in effective decision-making (Manias, Aitken, & Dunning, 2005). Any interventions aimed at increasing use of EBP should account for the different approaches CRNAs with differing years of experience use to obtain information. Mentoring new CRNAs in EBP use will be much more straightforward than preparing a more experienced CRNA to change.

CRNAs in this study changed practice techniques for different reasons, including the results of an evidence-based search, lack of resources, preference of the anesthesiologist, information gleaned from patient follow-up, or information provided by a colleague. Nurses in previous studies reported they preferred messages passed on to them by a third party rather than becoming directly involved themselves (McCaughan et al., 2002). As with every skill set, the more experienced providers may change their practice more fluently based on their years of experience. For example, when faced with a drug shortage, one CRNA simply asked her colleagues for their advice and then changed her practice. Less experienced CRNAs who have been taught a single, albeit evidence-based, technique may be at a loss when confronted with the same drug shortage situation. Practice change is complex and an EBP implementation program should consist of interactive education and reminders (Sung, Chang, & Abbey, 2008). This will facilitate knowledge and adoption of evidence-based nursing practice (Sung et al., 2008).

Certification is accepted as necessary to obtain employment in nursing anesthesia.

Presently CRNAs are required to attend 40 hours of continuing education every two years to renew their certification with the AANA. Most CRNAs in this study read articles and answered quizzes from *Current Reviews for Nurse Anesthetists* to reach their continuing education requirements. Others attended conferences or read articles and answered quizzes from *AANA Journal*. The mission of Frank Moya Continuing Education Programs, LLC, publisher of *Current Reviews for Nurse Anesthetists,* is to "create educational activities that change competence, performance and/or patient outcomes by increasing providers' knowledge, awareness and practice strategies for specific problems in anesthesia" (Current Reviews, 2013). A study of physiotherapists' attitudes toward EBP reported difficulty in reading journals, and in terms of clinical practice, literature, journals, and research were ascribed low priority (Stevenson, Lewis, & Hay, 2004). Because of the continuing education requirement, CRNAs are exposed to clinical research, although the subjects are predetermined. A clinical question that arises in the practice of anesthesia would need to be answered by accessing research to obtain best evidence-based practice. Although nurse anesthetists are exposed to continuing education, it is still important to assess barriers to the use of evidence-based practice in order to facilitate its use in daily practice.

Limitations of the Study

Study limitations must be taken into account when considering these findings. One limitation is the sample size of 92 participants and response rate of 9.5%, and may be as a result of utilizing email surveys only. Previous researchers have had higher response rates with paper surveys (Martins et al., 2012). Although the response rate was low, it was similar to the response rate of another study of EBP (Rice et al., 2010). However, an email membership survey from AANA reported 23% response rate (American Association of Nurse Anesthetists, 2011b) as

compared to the current study, indicating that emailed membership studies can result in higher response rates. Methods to improve the response rate in future studies include monetary incentives, multiple modes of response (Martins et al., 2012), stressing the importance of completing the survey, and keeping the invitation email brief (Ahearn, Bhat, Lakinson, & Baker, 2011). The CDC's guidelines for surveys suggest avoiding sending surveys out during busy times such as holidays and summer (Evaluation Research Team, 2010). The response rate might have been higher had the survey not been completed during the summer.

The survey itself contained an error in the demographics section, as bachelor's degree for nurse anesthesia as a choice for highest level of education was unintentionally omitted. A participant discovered this after the survey was launched. A more detailed collection of primary practice characteristics with mutually exclusive categories would improve analyses and enable the researcher to perhaps draw more conclusions regarding specific work sites and EBP use. Also, no pilot study was performed to assess the appropriateness of the length and burden of the survey before implementation.

Strengths of the Study

This study used the reliable and valid BARRIERS scale to assess CRNAs in Georgia. At the time of design it was the only survey to address EBP use in CRNAs. The survey obtained important data allowing the characteristics of CRNA demographics to be compared with barriers to research utilization. Also, the qualitative portion of the study was unique in that it allowed the researcher to delve deeper into thought processes of CRNAs as they consider EBP.

Implications for Theory Building

This study used the Unfreezing stage of Kurt Lewin's three-stage change model. This study is the first step in further examination of barriers and facilitators to the use of EBP by

CRNAs. The second step is initiating the change stage by using information obtained from this study to implement initiatives to increase EBP use. The third stage, refreeze, establishes the use of EBP as a habit (Nursing Theory, 2011), and can be used to follow up on the changes that occur in nursing anesthesia practice. This study contributes to the body of evidence of Lewin's Change Theory by providing a situation that was investigated, assessed, and found wanting. CRNAs' perceived barriers to the use of EBP were identified, relationships with the sample's demographics were explored, and findings show a need to increase implementation of EBP use in CRNAs. Other studies that include the BARRIERS scale have used Roger's Diffusion of Innovation Theory because it describes how over time an idea or product gains momentum and diffuses through a specific population or social system with an end result of adoption of a new idea, behavior, or product (Boston University School of Public Health, 2013). Because this study was designed to identify barriers as a first step of the three stages of change, Lewin's theory was chosen. Continuation of the steps of the theory will occur with subsequent studies.

Implications for Practice

As the call for increased use of EBP continues, CRNAs need to assess their practice for the inclusion of such. CRNAs who are new graduates or have limited experience may have been introduced to the concept of EBP in their education. Other CRNAs who are more experienced may not have been exposed to the concept. Thus, it is the responsibility of the CRNA to follow research and include appropriate findings in their practice. Evidence-based practice includes the combination of experience, patient's wishes, and the best available information regarding care. Biddle and Hershkowitz (2011) stated CRNAs' views based on belief rather than sound evidence exert too much influence on healthcare decision-making and as nursing anesthesia evolves and becomes a doctoral education, the research community should continue to develop, and the

practice community use the evidence developed to provide safe and efficacious anesthesia care. Evaluation of care is also important following implementation of EBP to permit feedback and revision as necessary (Proctor, 2004). CMS' Surgical Care Improvement Project (SCIP) includes appropriately timed antibiotic dosage preoperatively (Department of Health & Human Services, 2010). CRNAs may be adhering to these guidelines in order to improve patient quality and not be aware of the source of the guidelines.

Future Research

The process of changing attitudes in the clinical environment is a complex issue worthy of further research (Stevenson et al., 2004). Findings from this study provide opportunities for such research. This study should be replicated, conceivably with a sample that includes all CRNAs in the United States. Future studies could include the change and refreeze portions of Lewin's change theory. If this survey was administered to anesthesia providers at individual practice sites, perhaps the change and refreeze portions of the theory could be used to create an individual plan for increased EBP use in that particular site. As previously discussed, collection of more detailed demographic information regarding primary practice sites might improve the strength of this study and make it more applicable to multiple practice sites.

Conclusion

CRNAs in Georgia were surveyed to assess barriers and facilitators to use of evidence-based practice. The BARRIERS scale and the Evidence-Based Practice Questionnaire were administered to CRNAs in Georgia. Significant results included a negative correlation between education levels of CRNAs and perceived barriers toward EBP and a positive correlation between years of practice as a CRNA and perceived barriers toward EBP. CRNAs have a strong

history of providing safe, effective anesthesia to patients in every walk of life. This study adds to the body of literature information regarding EBP use by CRNAs in the frequently changing landscape of healthcare in the United States. To continue the forward path of nursing anesthesia, CRNAs must commit to including more evidence-based care into their practice.

Appendix A

Subject: You are invited to a research survey –

Assessing Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Anesthesia Practice

Dear CRNAs:

You are invited to participate in a research study titled "Assessing Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Anesthesia Practice". This study is being conducted by Laurie E. Parkman, CRNA, and her research committee from Georgia College and State University. The present research available discusses barriers to implementation of evidence-based practice in nurses, physicians and other health care providers. The purpose of this study is to assess attitudes toward and barriers to the use of evidence-based practice in CRNAs in Georgia.

In this study, you will be asked to complete an electronic survey. Your participation in this study is voluntary and you are free to withdraw your participation from this study at any time. The survey should take only 15 to 20 minutes to complete.

This survey has been approved by the Institutional Review Board of Georgia College and State University. There are no risks associated with participating in this study. The survey collects no identifying information of any respondent. All of the response in the survey will be recorded anonymously.

While you will not experience any direct benefits from participation, information collected in this study may benefit the profession of anesthesia in the future by better understanding barriers to the use of evidence-based practice. Before any change to improve practice can occur, the attitudes and barriers of the providers must be assessed.

If you have any questions regarding the survey or this research project in general, please contact Laurie E. Parkman at lparkman@windstream.net. If you have any questions concerning your rights as a research participant, please contact the IRB of Georgia College and State University at 478-445-2123, or Marc Cardinalli, General Counsel, 478-445-2037, marc.cardinalli@gcsu.edu.

By completing and submitting this survey, you are indicating your consent to participate in the study. Your participation is appreciated. A waiver of informed consent is requested. The United States Department of Health and Human Services' Office for Human Research Protections (Office for Human Research Protections) provides criteria for waiver of informed consent. They include: the research involves no more than minimal risk to the subjects; and whenever appropriate, the subjects will be provided with additional pertinent information after participation.

Laurie E. Parkman CRNA, Doctoral Candidate, Georgia College and State University
Advisor Dr. D. MacMillan, School of Nursing, Georgia College and State University

Appendix B

Assessing Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Anesthesia Practice

Laurie Parkman

Georgia College

Participant Demographic and Characteristics Form

1. What is your age?
2. What is your gender? (Male/Female)
3. What is your race? (American Indian or Alaska Native/Asian/Black or African American/Native Hawaiian or Other Pacific Islander/White)
4. What is your ethnicity? (Hispanic or Latino/ Not Hispanic or Latino)
5. What is your level of education? (Diploma/Masters/Doctorate)
6. What year did you graduate from a CRNA program?
7. Choose all that apply to your primary practice environment. (List to include: Employee of an anesthesiologist group, Employee of a CRNA group, Employee of a hospital/surgical facility, Independent contractor, Independent contractor with medical direction by an anesthesiologist, Independent contractor with medical direction by any other type of physician, urban setting, rural setting)
8. How easy is it to access the Internet for research purposes? (Likert scale 1 to 7)

In your practice of anesthesia, please mark the guidelines that you currently use and the extent to which they guide your practice:

9. I currently use the Guidelines from American Society of Anesthesiologists (ASA).

   a. yes (If yes answer question 10)

   b. no (If no skip to question 11)

10. Guidelines from American Society of Anesthesiologists (ASA) guide my practice to the following extent

    a. No effect

    b. Somewhat of an effect

    c. Moderate effect

    d. Strong effect

    e. Very strong effect

11. I currently use Guidelines from Centers for Medicare and Medicaid (CMS)

    a. yes (If yes answer question 12)

    b. no (If no skip to question 13)

12. Guidelines from Centers for Medicare and Medicaid (CMS) guide my practice to the following extent

    a. No effect

    b. Somewhat of an effect

    c. Moderate effect

    d. Strong effect

    e. Very strong effect

13. I currently use Guidelines from American Association of Nurse Anesthetists (AANA)

    a. yes (If yes answer question 14)

    b. no (If no skip to question 15)

14. Guidelines from American Association of Nurse Anesthetists (AANA) guide my practice to the following extent

    a. No effect

    b. Somewhat of an effect

    c. Moderate effect

    d. Strong effect

    e. Very strong effect

15. I currently use guidelines from my practice facility

    a. yes (If yes answer question 16)

    b. no (If no move to the next section)

16. Guidelines from my practice facility guide my practice to the following extent

    a. No effect

    b. Somewhat of an effect

    c. Moderate effect

    d. Strong effect

    e. Very strong effect

Appendix C

Barriers and Facilitators to Using Research in Practice

Articles in nursing journals indicate that nurses in practice do not use the results of research to help guide their practice. There are a number of reasons why this might be. We would like to know the extent to which you think each of the following situations is a barrier to nurses' use of research to alter/enhance their practice.

If you currently hold a position in a clinical site, *please answer the questions in relation to your current work setting.* If you do not currently practice, *you may refer to your last clinical experience or provide your general perceptions.*

For each time, circle the number of the response that best represents your view. Thank you for sharing your views with us.

1. Research reports/articles are not readily available
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

2. Implications for practice are not made clear
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

3. Statistical analyses are not understandable
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

4. The research is not relevant to the nurse's practice
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

5. The nurse is unaware of the research
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

6. The facilities are inadequate for implementation
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

7. The nurse does not have time to read research
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

8. The research has not been replicated
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

9. The nurse feels the benefits of changing practice will be minimal
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

10. The nurse is uncertain whether to believe the results of the research
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

11. The research has methodological inadequacies
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

12. The relevant literature is not compiled in one place
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

13. The nurse does not feel she/he has enough authority to change patient care procedures
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

14. The nurse feels results are not generalizable to own setting
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

15. The nurse is isolated from knowledgeable colleagues with whom to discuss the research
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

16. The nurse sees little benefit for self
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

17. Research reports/articles are not published fast enough
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

18. Physicians will not cooperate with implementation
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

19. Administration will not allow implementation
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

20. The nurse does not see the value of research for practice
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

21. There is not a documented need to change practice
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

22. The conclusions drawn from the research are not justified
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

23. The literature reports conflicting results
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

24. The research is not reported clearly and readably
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

25. Other staff are not supportive of implementation
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

26. The nurse is unwilling to change/try new ideas

to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

27. The amount of research information is overwhelming
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

28. The nurse does not feel capable of evaluating the quality of the research
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

29. There is insufficient time on the job to implement new ideas
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

Are there other things you think are barriers to research utilization? If so, please list and rate each on the scale:

30. _____
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

31. _____
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

32. _____
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

33. _____
to no extent 1 to a little extent 2 to a moderate extent 3 to a great extent 4 no opinion 5

34. Which of the above items do you feel are the *three greatest barriers* in nurses' use of research?

Greatest Barrier.....Item #_____
Second Greatest Barrier.....Item #_____
Third Greatest Barrier.....Item #_____

35. What are the things you think *facilitate* research utilization?

_____

_____

_____

_____

This questionnaire was adapted from:

Crane, J., Pelz, D., and Horsley, J.A. *CURN Project Research Utilization Questionnaire*. Ann Arbor, Michigan: Conduct and Utilization of Research in Nursing Project, School of Nursing. The University of Michigan, 1977

Appendix D

Evidence Based Practice Questionnaire

This questionnaire is designed to gather information and opinions on the use of evidence based practice amongst health professionals. There are no right or wrong answers for we are interested in *your* practice.

1. **Considering your practice in relation to an individual patient's care over the *past* year, how often have you done the following in response to a gap in your knowledge:**

Formulated a clearly answerable question as the beginning of the process towards filling this gap:
Never * * * * * * * **Frequently**

Tracked down the relevant evidence once you have formulated the question:
Never * * * * * * * **Frequently**

Critically appraised, against set criteria, any literature you have discovered:
Never * * * * * * * **Frequently**

Integrated the evidence you have found with your expertise:
Never * * * * * * * **Frequently**

Evaluated the outcomes of your practice:
Never * * * * * * * **Frequently**

Shared this information with colleagues:
Never * * * * * * * **Frequently**

2. Please indicate (by √ or X) where on the scale you would place yourself for each of the following pairs of statements:

My workload is too great for me to keep up to date with all the new evidence	☐ ☐ ☐ ☐ ☐ ☐ ☐	New evidence is so important that I make the time in my work schedule
I resent having my clinical practice questioned	☐ ☐ ☐ ☐ ☐ ☐ ☐	I welcome questions on my practice
Evidence based practice is a waste of time	☐ ☐ ☐ ☐ ☐ ☐ ☐	Evidence based practice is fundamental to professional practice
I stick to tried and trusted methods rather than changing to anything new	☐ ☐ ☐ ☐ ☐ ☐ ☐	My practice has changed because of evidence I have found

3. On a scale of 1 to 7 (with 7 being the best) how would you rate your:

Please circle one number for each statement							
	Poor						**Best**
Research skills	1	2	3	4	5	6	7
IT skills	1	2	3	4	5	6	7
Monitoring and reviewing of practice skills	1	2	3	4	5	6	7
Converting your information needs into a research question	1	2	3	4	5	6	7
Awareness of major information types and sources	1	2	3	4	5	6	7
Ability to identify gaps in your professional practice	1	2	3	4	5	6	7
Knowledge of how to retrieve evidence	1	2	3	4	5	6	7
Ability to analyze critically evidence against set standards	1	2	3	4	5	6	7
Ability to determine how valid (close to the truth) the material is	1	2	3	4	5	6	7
Ability to determine how useful (clinically applicable) the material is	1	2	3	4	5	6	7
Ability to apply information to individual cases	1	2	3	4	5	6	7
Sharing of ideas and information with colleagues	1	2	3	4	5	6	7
Dissemination of new ideas about care to colleagues	1	2	3	4	5	6	7
Ability to review your own practice	1	2	3	4	5	6	7

Appendix E

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Laurie Parkman** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 07/29/2012

Certification Number: 957469

Appendix F

AGREEMENT TO USE THE BARRIERS SCALE

I agree to the above conditions for using the BARRIERS Scale

Name: Laurie E. Parkman

Title: Certified Registered Nurse Anesthetist, DNP candidate

E-mail: lparkman@windstream.net
Address: 3826 Jackson Rd.
McIntyre, GA 31054

Academic/business affiliation Georgia College and State University
Phone Number: 478-972-2033

Study Title: Examining Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Practice
Brief Description of Study:

CRNAs will be electronically surveyed via email through the American Association of Nurse Anesthetists Research Department. The surveys are the BARRIERS scale, Evidence-Based Practice Questionnaire, and a participant characteristics and demographics form.

Signature Laurie E. Parkman Date 5/4/13

Please keep a copy of this form in your files. For students, signing this form and mailing it to me should serve as permission to use this scale for your research report, thesis or dissertation.

Mail to:
Sandra G. Funk, PhD School
of Nursing Carrington Hall,
CB# 7460
University of North Carolina – Chapel Hill
Chapel Hill, NC 27599-7460

Appendix G

Dear Laurie,
I am a Psychology Technician and assist with requests for Professor Upton's publications. Professor Upton and Dr. Upton would be happy to provide you with a copy of the measure free of charge and grant permission to use it in your project, with the proviso that as authors they are acknowledged in any communication, including publication, in which the questionnaire is used.
I have attached a copy of the questionnaire and a paper which contains details of its development and construction (Upton & Upton, 2006). Each item on the questionnaire is scored from 1-7 (i.e. 1=Poor – 7= best) and an average score can then be calculated for each subscale (Practice (1), Attitudes (2) and Knowledge/Skills (3)).

In accordance with UK copyright law we would be grateful if you would refer anyone else interested in using the EBPQ to us, rather than distribute copies of the questionnaires to third parties yourself. This will also help the authors gauge the level of interest in the questionnaire and its application in the clinical/research/educational setting.
Many thanks for your interest in the EBPQ and good luck with your project. Please feel free to contact me if you would like any further information.
Best wishes,

Laura.

Laura Scurlock-Evans BSc (Hons), PGD PRM (Open), MBPsS
Psychology technician, PhD student & sessional lecturer.
Room: BB065
Phone: (01905) 85 5190
e-mail: l.scurlock-evans@worc.ac.uk

References

About the Cochrane Library. (2013). from http://www.cochrane.org/cochrane-reviews/about-cochrane-library

Abrahamson, K. A., Fox, R. L., & Deobbeling, B. N. (2012). Facilitators and barriers to clinical practice guideline use among nurses. *American Journal of Nursing, 112*(7), 26-35.

Agency for Healthcare Research and Quality. (2001). *Translating research into practice*. (01-P017). Rockville, MD: Agency for Healthcare Research and Quality Retrieved from http://www.ahrq.gov/research/findings/factsheets/translating/tripfac/index.html.

Ahearn, D., Bhat, S., Lakinson, T., & Baker, P. (2011). Maximising responses to quality assurance surveys. *The Clinical Teacher 8*(4), 258-262.

Aiken, L. H., Clarke, S. P., Cheung, R. B., Sloane, D. M., & Silber, J. H. (2003). Educational levels of hospital nurses and surgical patient mortality. *JAMA, 290*(12), 1617-1623. doi: 10.1001/jama.290.12.1617

American Association of Nurse Anesthetists. (2011a). Get the Facts on Certified Registered Nurse Anesthetists (CRNAs). Washington, DC: American Association of Nurse Anesthetists.

American Association of Nurse Anesthetists. (2011b). AANA Member Survey Data. Retrieved October 21, 2013, from http://www.aana.com/myaana/AANABusiness/aanasurveys/Documents/aana-member-survey-data-nov2011.pdf

American Association of Nurse Anesthetists. (2012). Policy on Evidence-based process for practice-related document creation. Retrieved October 31, 2013, from

http://www.aana.com/resources2/professionalpractice/Documents/Policy%20on%20Evidence-based%20Process%20for%20Practice%20Related%20Document%20Creation.pdf

American Association of Nurse Anesthetists. (2013a). AANA Journal Online. Retrieved October 31, 2013, from http://www.aana.com/newsandjournal/Pages/aanajournalonline.aspx

American Association of Nurse Anesthetists. (2013b). Professional Practice Documents. from http://www.aana.com/resources2/professionalpractice/Pages/Professional-Practice-Manual.aspx#four

American Nurses Credentialing Center. (2013a). About ANCC. *American Nurses Credentialing Center.* Retrieved April 6, 2013, from http://nursecredentialing.org/FunctionalCategory/AboutANCC

American Nurses Credentialing Center. (2013b). Program Overview. Retrieved April 6, 2013, from http://nursecredentialing.org/Magnet/ProgramOverview

Anesthesia Patient Safety Foundation. (2010). Resources Newsletters. Retrieved October 31, 2013, from http://apsf.org/resources.php

American Society of Anesthesiologists. (2012). Practice Parameters. Retrieved November 1, 2013, from http://www.asahq.org/Home/For-Members/Practice-Management/Practice-Parameters

Balas, E., & Boren, S. (2000). Managing Clinical Knowledge for Health Care Improvement. In V. Schattauer (Ed.), *Yearbook of Medical Informatics* (pp. 65-70). Bethesda, Maryland: National Library of Medicine.

Bates, D., & Gawande, A. (2003). Improving safety with information technology. *The New England Journal of Medicine, 348*(25), 2526-2534.

Bellamy, J., Bledsoe, S., & Traube, D. (2006). The Current State of Evidence-Based Practice in Social Work: A Review of the Literature and Qualitative Analysis of Expert Interviews. *Journal of Evidence-Based Social Work, 3*(1), 23-48.

Biddle, C., & Hershkowitz, L. (2011). The AANA Journal Special Research Edition: Two Views on its relevance. *AANA Journal, 79*(4), S4-S5.

Bishop, S. (2011). Theories of Organizational Behavior and Leadership. In J. Butts & K. Rich (Eds.), *Philosophies and Theories for Advanced Nursing Practice* (pp. 347-362). Sudbury, MA: Jones & Barlett Learning, LLC.

Bogdan-Lovis, E. A., & Sousa, A. (2006). The contextual influence of professional culture: certified nurse-midwives' knowledge of and reliance on evidence-based practice. *Social Science & Medicine, 62*(Yentis), 2681-2693. doi: 10.1016/j.socscimed.2005.11.027

Boston University School of Public Health. (2013). Diffusion of Innovation Theory. Behavioral Change Models. Retrieved November 2, 2013, from http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/SB721-Models/SB721-Models4.html

Bostrom, A. M., Kajermo, K. N., Nordstrom, G., & Wallin, L. (2008). Barriers to research utilization and research use among registered nurses working in the care of older people: does the BARRIERS scale discriminate between research users and non-research users on perceptions of barriers? *Implementation Science, 3*, 24. doi: 10.1186/1748-5908-3-24

Bowman, A., Greiner, J., Doerschug, K., Little, S., Bombei, C., & Comried, L. (2005). Implementation of an Evidence-based Feeding Protocol and Aspiration Risk Reduction Algorithm. *Critical Care Nurse Quarterly, 28*(4), 324-333.

Brown, C. E., Wickline, M. A., Ecoff, L., & Glaser, D. (2009). Nursing practice, knowledge, attitudes and perceived barriers to evidence-based practice at an academic medical center. *Journal of Advanced Nursing, 65*(2), 371-381. doi: 10.1111/j.1365-2648.2008.04878.x

Bunch, D. (2008). Clearing the barriers to protocol implementation: AARC survey shows what needs to be done and why. *AARC Times, 32*(10), 90-93.

Centers for Medicare & Medicaid Services. (2013). Details for Regulation No.: CMS-1589-FC. from http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalOutpatientPPS/Hospital-Outpatient-Regulations-and-Notices-Items/CMS-1589-FC.html

Chapman, N., Lazar, S. P., Fry, M., Lassere, M. N., & Chong, B. H. (2011). Clinicians adopting evidence based guidelines: a case study with thromboprophylaxis. *BMC Health Services Research, 11*, 240. doi: 10.1186/1472-6963-11-240

Chassin, M., & Galvin, R. (1998). The urgent need to improve health care quality: Institute of Medicine National Roundtable on Health Care Quality. *JAMA, 280*(11), 1000-1005.

Cheung, R., Aiken, L. H., Clarke, S. P., & Sloane, D. M. (2010). Nursing care and patient outcomes: international evidence. *Enfermeria Clinica, 18*(1), 35-40.

Ciaschi, A., Caprara, A., Gillespie, F., Furnari, G., & Mamede, S. (2011). Changing doctors' behaviours: an educational program to disseminate a new clinical pathway for the hospital management of hip fractures in elderly patients in the Lazio Region, Italy. *Journal of Evaluation in Clinical Practice, 17*(4), 811-818. doi: 10.1111/j.1365-2753.2010.01496.x

Committee on Quality of Health Care in America, Institute of Medicine. (2000). To Err is Human: Building a Safer Health System. In L. Kohn, J. Corrigan & M. Donaldson (Eds.),

To Err is Human: Building a Safer Health System National Academy of Sciences: National Academies Press.

Committee on Quality of Health Care in America, Institute of Medicine. (2001). *Crossing the Quality Chasm: A new health system for the 21st century* Washington, D.C.: National Academy Press.

Committee on the Health Professions Education Summitt Institute of Medicine. (2003). *Health Professionals Education: A Bridge to Quality*. Washington, DC: National Academies Press.

Current Nursing. (2011). Change Theory. *Nursing Theories.* Retrieved April 30, 2013, from http://currentnursing.com/nursing_theory/change_theory.html

Current Reviews. (2013). Current Reviews in Clinical Anesthesia & Current Reviews for Nurse Anesthetists. Retrieved November 2, 2013, from http://www.currentreviews.com/home+study+courses/

Davis, D., Evans, M., Jadad, A., Perrier, L., Rath, D., Ryan, D., . . . Zwarenstein, M. (2003). The case for knowledge translation: shortening the journey from evidence to effect. *British Medical Journal, 327*, 33-35.

Department of Health & Human Services. (2010). Medicare Fact Sheet. Washington, DC: Centers for Medicare & Medicaid Services.

Evaluation Research Team, Department of Health and Human Services, Centers for Disease Control and Prevention. (2010). Increasing Questionnaire Response Rates. Retrieved November 2, 2013, from http://www.cdc.gov/HealthyYouth/evaluation/pdf/brief21.pdf

Fink, R., Thompson, C., & Bonnes, D. (2005). Overcoming Barriers and Promoting the Use of Research in Practice. *Journal of Nursing Administration, 35*(3), 121-129.

Funk, S., Champagne, M., Wiese, R., & Tornquist, E. (1991a). Barriers to Using Research Findings in Practice: The Clinician's Perspective. *Applied Nursing Research, 4*(2), 90-95.

Funk, S., Champagne, M., Wiese, R., & Tornquist, E. (1991b). BARRIERS: The barriers to research utilization scale. *Applied Nursing Research, 4*(1), 39-45.

Gawande, A. (2009). *The Checklist Manifesto how to get things right*. New York: Picador.

Gordon, R. (2012). Anesthesia dogmas and shibboleths: barriers to patient safety? *Anesthesia & Analgesia, 114*(3), 694-699. doi: 10.1213/ANE.0b013e3182455b86

Griffiths, R., Alper, J., Beckingsale, A., Goldhill, D., Heyburn, G., Holloway, J., . . . Wilson, I. (2012). Management of proximal femoral fractures 2011: Association of Anaesthetists of Great Britain and Ireland. *Anaesthesia, 67*(1), 85-98. doi: 10.1111/j.1365-2044.2011.06957.x

Grol, R. (2001). Successes and Failures in the Implementation of Evidence-Based Guidelines for Clinical Practice. *Medical Care, 39*(8), II-46-II-54.

Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *The Lancet, 362*(9391), 1225-1230.

Grol, R., & Wensing, M. (2004). What drives change? Barriers to and incentives for achieving evidence-based practice. *Medical Journal of Australia, 180*(6 Supplement), S57-60.

Gross, P., Greenfield, S., Cretin, S., Ferguson, J., Grimshaw, J., Grol, R., . . . Shaw, C. (2001). Optimal Methods for Guideline Implementation Conclusions from Leeds Castle Meeting. *Medical Care, 39*(8), II-85-II-92.

Headley, C. M. (2012). Making the case for cookbook care. *Nephrology Nursing Journal, 39*(5), 413-415.

Heater, B., Becker, A., & Olson, R. (1988). Nursing interventions and patient outcomes: A meta-analysis of studies [Abstract]. *Nursing Research, 37*(5).

Hines, P. (2009). The changing reimbursement landscape: Nurses' role in quality and operational excellence. *Nursing Economics, 27*(1), 7-13.

Hutchinson, A., & Johnston, L. (2004). Bridging the divide: a survey of nurses' opinions regarding barriers to, and facilitators of, research utilization in the practice setting. *Journal of Clinical Nursing, 13*(3), 304-315.

Institute of Medicine. (2011). Clinical Practice Guidelines We Can Trust. Washington, DC: Institute of Medicine of the National Academies.

Jennings-Sanders, A., Jury, L., & Burant, C. (2011). VA nurses' opinions regarding the use of evidence-based practice. *Federal Practitioner, 28*(5), 31-38.

Karkos, B., & Peters, K. (2006). A Magnet community hospital: Fewer barriers to nursing research utilization. *Journal of Nursing Administration, 36*(7-8), 377-382.

Kocaman, G., Seren, S., Lash, A. A., Kurt, S., Bengu, N., & Yurumezoglu, H. A. (2010). Barriers to research utilisation by staff nurses in a university hospital. *Journal of Clinical Nursing, 19*(13-14), 1908-1918. doi: 10.1111/j.1365-2702.2009.03032.x

Knops, A. M., Vermeulen, H., Legemate, D. A., & Ubbink, D. T. (2009). Attitudes, awareness, and barriers regarding evidence-based surgery among surgeons and surgical nurses. *World Journal of Surgery, 33*(7), 1348-1355. doi: 10.1007/s00268-009-0020-8

Leach, M. J. (2006). Evidence-based practice: a framework for clinical practice and research design. *International Journal of Nursing Practice, 12*(5), 248-251. doi: 10.1111/j.1440-172X.2006.00587.x

Li, G., Warner, M., Lang, B., Huang, L., & Sun, L. (2009). Epidemiology of Anesthesia-related Mortality in the United States, 1999-2005. *Anesthesiology, 110*(4), 759-765.

Low, D., Walker, I., Heitmiller, E. S., & Kurth, D. (2012). Implementing checklists in the operating room. *Paediatric Anaesthesia, 22*(10), 1025-1031. doi: 10.1111/pan.12018

Manias, E., Aitken, R., & Dunning, T. (2005). How graduate nurses use protocols to manage patients' medications. *Journal of Clinical Nursing, 14*(8), 935-944. doi: 10.1111/j.1365-2702.2005.01234.x.

Martins, Y., Lederman, R. I., Lowenstein, C. L., Joffe, S., Neville, B. A., Hastings, B. T., & Abel, G. A. (2012). Increasing response rates from physicians in oncology research: a structured literature review and data from a recent physician survey. *British Journal of Cancer, 106*(6), 1021-1026. doi: 10.1038/bjc.2012.28

McCaughan, D., Thompson, C., Cullum, N., Sheldon, T., Mulhall, A., & Thompson, D. (2002). Acute care nurses' perceptions of barriers to using research information in clinical decision-making. *Journal of Advanced Nursing, 39*(1), 46-60.

McGarry, D., Cashin, A., & Fowler, C. (2012). Child and adolescent psychiatric nursing and the 'plastic man': Reflections on the implementation of change drawing insights from Lewin's theory of planned change. *Contemporary Nurse, 41*(2), 263-270.

Melnyk, B. (2007). The Evidence-Based Practice Mentor: A promising strategy for implementing and sustaining EBP in healthcare systems. *Worldviews on Evidence-Based Nursing, 4*(3), 123-125.

Melnyk, B., Fineout-Overholt, E., Feinstein, N., Sadler, L., & Green-Hernandez, C. (2008). Nurse practitioner educators' perceived knowledge, beliefs, and teaching strategies regarding evidence-based practice: Implications for accelerating the integration of

evidence-based practice into graduate programs. *Journal of Professional Nursing, 24*(1), 7-13.

Miller, R., Eriksson, L., Fleisher, L., Wiener-Kronish, J., & Young, W. (2010). *Miller's Anesthesia* (7th ed.). Philadelphia: Churchill Livingstone El Sevier.

Mullen, E., Shlonsky, A., Bledsoe, S., & Bellamy, J. (2005). From concept to implementation: Challenges facing evidence-based social work. *Evidence & Policy: A Journal of Research, Debate and Practice, 1*(1), 61-84. doi: 10.1332/1744264052703159

Murphy, F. (2006). Using change in nursing practice: a case study approach. *Nursing Management, 13*(2), 22-25.

National Center for Biotechnology Information, US National Library of Medicine. (2011, November 14, 2011). PMC Overview. Retrieved October 30, 2013, from http://www.ncbi.nlm.nih.gov/pmc/about/intro/

National Health and Medical Research Council. (1999). A guide to the development, implementation and evaluation of clinical practice guidelines. In National Health and Medical Research Council (Ed.), (pp. 1-88).

Neft, M., & Greenier, E. (2013). An Update from the AANA Practice Committee: Application of the Evidence-Based Process. *AANA Journal, 81*(1), 9-12.

Nursing Theory. (2011). Lewin's Change Theory. Retrieved November 2, 2013, from file:///Users/lparkman/Documents/a%20Translational%20articles/1theory%20articles/Lewin's%20Change%20Theory%20-%20Nursing%20Theory.webarchive

Office for Human Research Protections. (1998). Informed Consent Checklist - Basic and Additional Elements. *46.116.* from http://www.hhs.gov/ohrp/policy/consentckls.html

Palmer, T. (2013). *Barriers to Research Utilization by Certified Registered Nurse Anesthetists.* (Doctoral Dissertation). Retrieved from Proquest.com. (1308877)

Parahoo, K. (2000). Barriers to, and facilitators of, research utilization among nurses in Northern Ireland. *Journal of Advanced Nursing, 31*(1), 89-98.

Pellegrini, J. (2006). Using evidence-based practice in nurse anesthesia programs. *AANA Journal, 74*(4), 269-273.

Proctor, E. K. (2004). Leverage Points for the Implementation of Evidence-Based Practice. *Brief Treatment and Crisis Intervention, 4*(3), 227-242. doi: 10.1093/brief-treatment/mhh020

Pronovost, P., Needham, D., Berenholzt, S., Sinopoli, D., Chu, H., Cosgrove, S., . . . Goeschel, C. (2006). An intervention to decrease catheter-related bloodstream infections in the ICU. *The New England Journal of Medicine, 355*(26), 2725-2732.

Rauen, C. A., Chulay, M., Bridges, E., Vollman, K., & Arbour, R. (2008). Seven Evidence-Based Practice Habits: Putting Some Sacred Cows Out to Pasture. *Critical Care Nurse, 28*(2), 98-124.

Rice, K., Hwang, J., Abrefa-Gyan, T., & Powell, K. (2010). Evidence-Based Practice Questionnaire: A Confirmatory Factor Analysis in a Social Work Sample. *Advances in Social Work, 11*(2), 158-173.

Rickbeil, P., & Simones, J. (2012). Overcoming Barriers to Implementing Evidence-Based Practice. *Journal for Nurses in Staff Development, 28*(2), 53-56.

Sackett, D., Rosenberg, W., Muir Gray, J., Haynes, R., & Richardson, W. (1996). Evidence-based medicine: what it is and what it isn't. *British Medical Journal, 312*(7023), 71-72.

Sandelowski, M., & Barroso, J. (2002). Reading Qualitative Studies. *International Journal of Qualitative Methods, 1*(1), 74-108.

Schardt, C., & Mayer, J. (2010, July 28). Introduction to Evidence-Based Practice. Retrieved March 13, 2013, from http://www.hsl.unc.edu/services/tutorials/ebm/welcome.htm

Scott, S. D., Grimshaw, J., Klassen, T. P., Nettel-Aguirre, A., & Johnson, D. W. (2011). Understanding implementation processes of clinical pathways and clinical practice guidelines in pediatric contexts: a study protocol. *Implementation Science, 6*, 133. doi: 10.1186/1748-5908-6-133

Sole, M., Byers, J., Ludy, J., Zhang, Y., Banta, C., & Brummel, K. (2003). A multisite survey of suctioning techniques and airway management practices. *American Journal of Critical Care, 12*(3), 220-230.

Stevenson, K., Lewis, M., & Hay, E. (2004). Do physiotherapist' attitudes toward evidence-based practice change as a result of an evidence-based educational programme? *Journal of Evaluation in Clinical Practice 10*(2), 207-217.

Stichler, J., Fields, W., Kim, S., & Brown, C. (2011). Faculty knowledge, attitudes, and perceived barriers to teaching evidence-based nursing. *Journal of Professional Nursing, 27*(2), 92-100.

Straus, S., Glasziou, P., Richardson, W., & Haynes, R. (2011). *Evidence-Based Medicine: How to Practice and Teach it, 4e* (4th ed.). Edinburgh: Churchill Livingstone Elsevier.

Sung, H., Chang, A. M., & Abbey, J. (2008). An implementation programme to improve nursing home staff's knowledge of and adherence to an individualized music protocol. *Journal of Clinical Nursing, 17*(19), 2573-2579. doi: 10.1111/j.1365-2702.2007.02010.x

Theimann, L., & McFadden, J. (2010). Advancing Evidence-Based Nurse Anesthesia Practice. *AANA Journal, 78*(4), 279-282.

Timmermans, S., & Mauck, A. (2005). The promises and pitfalls of evidence-based medicine. *Health Affairs 24*(1), 18-28. doi: 10.1377/hlthaff.24.1.18

Upton, D., & Upton, P. (2006). Development of an evidence-based practice questionnaire for nurses. *Journal of Advanced Nursing, 53*(4), 454-458.

Uysal, A., Temel, A. B., Ardahan, M., & Ozkahraman, S. (2010). Barriers to research utilisation among nurses in Turkey. *Journal of Clinical Nursing, 19*(23-24), 3443-3452. doi: 10.1111/j.1365-2702.2010.03318.x

Van Patter Gale, B., & Schaffer, M. (2009). Organizational readiness for evidence-based practice. *The Journal of Nursing Administration, 39*(2), 91-97.

Wennberg, J. E. (1984). Dealing with medical practice variations: a proposal for action. *Health Affairs, 3*(2), 6-32. doi: 10.1377/hlthaff.3.2.6

Westfall, J. M., Mold, J., & Fagnan, L. (2007). Practice-based research--"Blue Highways" on the NIH roadmap. *JAMA, 297*(4), 403-406. doi: 10.1001/jama.297.4.403

White, K., & Dudley-Brown, S. (2012). *Translation of Evidence into Nursing and Health Care Practice*. New York: Springer Publishing Company, LLC.

Williams, E., & von Fintel, N. (2012). Hypertonic saline: a change of practice. *Nursing in Critical Care, 17*(2), 99-104. doi: 10.1111/j.1478-5153.2011.00481.x

Woolf, S., Grol, R., Hutchinson, A., Eccles, M., & Grimshaw, J. (1999). Potential benefits, limitations, and harms of clinical guidelines. *British Medical Journal, 318*(7182), 527-530.

Zhang, A., & Liu, X. (2011). Clinical pathways: effects on professional practice, patient outcomes, length of stay and hospital costs. *International Journal Evidence-Based Healthcare, 9*(2), 191-192. doi: 10.1111/j.1744-1609.2011.00223.x

GEORGIA COLLEGE
GEORGIA'S PUBLIC LIBERAL ARTS UNIVERSITY

Ina Dillard Russell Library
Special Collections

Deposit and Access License Agreement

I hereby grant to Georgia College and State University ("GC") the non-exclusive, irrevocable, perpetual right to retain, reproduce, digitize, and distribute the deposited work ("Work") in whole or in part, in and from its electronic format, without fee. This agreement does not represent a transfer of copyright to GC. I may restrict online access to Work's title page by designating below. GC shall retain the right to remove the work(s) for professional or administrative reasons, or if they are found to violate the legal rights of any person. GC shall not be under obligation to take legal action on behalf of the depositor or other rights holders in the event of infringement of intellectual property rights or any other right in the material deposited.

GC may make and keep more than one copy of the Work for purposes of security, backup, preservation, and access and may migrate the Work to any medium or format for the purpose of preservation and access in the future. GC will not make any alteration, other than as allowed by this agreement, to the Work. GC Shall not be under obligation to reproduce, transmit, or display the work(s) in the same format or software as that in which it was originally created. While every care will be taken to preserve the physical integrity of the work(s), GC shall incur no liability, either expressed or implicit, for the work or for loss of or damage to any of the work(s) or associated data.

I represent and warrant to GC that the Work is my original work. I also represent that the Work does not, to the best of my knowledge, infringe or violate any rights of others. If the Work contains materials that I do not hold copyright to, I further represent I have obtained the unrestricted permission of the copyright owner to grant GC the rights required by this license, and that such third-party owned material is clearly identified and acknowledged within the text or content of the submission. If the submission is based upon work that has been sponsored or supported by an agency or organization other than GC, I represent that I have fulfilled any right of review or other obligations required by such contract or agreement.

By granting this license, I acknowledge that I have read and agreed to the terms of this agreement and all related GC policies. This document will be stored in Special Collections attached to each deposited work submitted by the signee.

Name (print): Laurie E Parliman Email: [redacted] Phone: [redacted]

Title of Work: Assessing Certified Registered Nurse Anesthetists' Attitudes Toward and Barriers to the Use of Evidence-Based Anesthesia Practice

Signature: Laurie Parliman Date: 1/31/14

Restrict Online Access to Title Page: ☐ Yes ☒ No

Library Use Only

Library Staff: [signature] Date Rec.: 1/31/2014 Signature: [signature] Location: SC